

- ☒ Final Report
☐ Re-Issued Report
☐ Revised Report

Report Date:
10-Jan-17 16:21

Laboratory Report

Gulf Oil L.P.
281 Eastern Avenue
Chelsea, MA 02150
Attn: Andrew P. Adams

Project: Gulf Terminal - Chelsea, MA
Project #: Gulf Chelsea

<u>Laboratory ID</u>	<u>Client Sample ID</u>	<u>Matrix</u>	<u>Date Sampled</u>	<u>Date Received</u>
SC29104-01	Chelsea Creek	Surface Water	05-Dec-16 11:00	05-Dec-16 17:25
SC29107-01	Outfall 003	Surface Water	05-Dec-16 11:00	05-Dec-16 17:25

I attest that the information contained within the report has been reviewed for accuracy and checked against the quality control requirements for each method. These results relate only to the sample(s) as received.
All applicable NELAC requirements have been met.

Massachusetts # M-MA138/MA1110
Connecticut # PH-0777
Florida # E87936
Maine # MA138
New Hampshire # 2972/2538
New Jersey # MA011
New York # 11393
Pennsylvania # 68-04426/68-02924
Rhode Island # LAO00348
USDA # P330-15-00375
Vermont # VT-11393



Authorized by:



June O'Connor
Laboratory Director

Eurofins Spectrum Analytical holds primary certification in the State of Massachusetts for the analytes as indicated with an X in the "Cert." column within this report. Please note that the State of Massachusetts does not offer certification for all analytes. Please refer to our website for specific certification holdings in each state.

Please note that this report contains 23 pages of analytical data plus Chain of Custody document(s). When the Laboratory Report is indicated as revised, this report supersedes any previously dated reports for the laboratory ID(s) referenced above. Where this report identifies subcontracted analyses, copies of the subcontractor's test report are available upon request. This report may not be reproduced, except in full, without written approval from Eurofins Spectrum Analytical, Inc.

Eurofins Spectrum Analytical, Inc. is a NELAC accredited laboratory organization and meets NELAC testing standards. Use of the NELAC logo however does not insure that Eurofins Spectrum Analytical, Inc. is currently accredited for the specific method or analyte indicated. Please refer to our Quality web page at www.spectrum-analytical.com for a full listing of our current certifications and fields of accreditation. States in which Eurofins Spectrum Analytical, Inc. holds NELAC certification are New York, New Hampshire, New Jersey, Pennsylvania and Florida. All analytical work for Volatile Organic and Air analysis are transferred to and conducted at our 830 Silver Street location (PA-68-04426).

Please contact the Laboratory or Technical Director at 800-789-9115 with any questions regarding the data contained in this laboratory report.

CASE NARRATIVE:

Data has been reported to the MDL. This report includes estimated concentrations detected below the RDL and above the MDL (J-Flag).

All non-detects and all results below the detection limit are reported as "<" (less than) the detection limit in this report.

The samples were received 3.3 degrees Celsius, please refer to the Chain of Custody for details specific to temperature upon receipt. An infrared thermometer with a tolerance of +/- 1.0 degrees Celsius was used immediately upon receipt of the samples.

If a Matrix Spike (MS), Matrix Spike Duplicate (MSD) or Duplicate (DUP) was not requested on the Chain of Custody, method criteria may have been fulfilled with a source sample not of this Sample Delivery Group.

Analyses for Total Hardness, pH, and Total Residual Chlorine fall under the state of Pennsylvania code Chapter 252.6 accreditation by rule.

Please note this report contains 26 pages of analytical data from New England Bioassay.

See below for any non-conformances and issues relating to quality control samples and/or sample analysis/matrix.

EPA 200.8

Spikes:

1621627-MS1 *Source: SC29104-01*

The spike recovery was outside acceptance limits for the MS, MSD and/or PS due to matrix interference. The LCS and/or LCSD were within acceptance limits showing that the laboratory is in control and the data is acceptable.

Copper

Duplicates:

1621627-DUP1 *Source: SC29104-01*

The Reporting Limit has been raised to account for matrix interference.

Copper

1622075-DUP1 *Source: SC29107-01*

The Reporting Limit has been raised to account for matrix interference.

Chromium

Samples:

SC29104-01 *Chelsea Creek*

The Reporting Limit has been raised to account for matrix interference.

Copper

SC29107-01 *Outfall 003*

The Reporting Limit has been raised to account for matrix interference.

Chromium

SM4500-Cl-G (11)

Spikes:

1621261-MS1 *Source: SC29104-01*

SM4500-Cl-G (11)

Spikes:

1621261-MS1 *Source: SC29104-01*

The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.

Total Residual Chlorine

1621261-MSD1 *Source: SC29104-01*

The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.

Total Residual Chlorine

Duplicates:

1621261-DUP1 *Source: SC29104-01*

The Reporting Limit has been raised to account for matrix interference.

Total Residual Chlorine

Samples:

SC29104-01 *Chelsea Creek*

The Reporting Limit has been raised to account for matrix interference.

Total Residual Chlorine

SC29107-01 *Outfall 003*

The Reporting Limit has been raised to account for matrix interference.

Total Residual Chlorine

SW846 8260C

Calibration:

1611062

Analyte quantified by quadratic equation type calibration.

Naphthalene

This affected the following samples:

1621362-BLK1
1621362-BS1
1621362-BSD1
1621363-BLK1
1621363-BS1
1621363-BSD1
Chelsea Creek
Outfall 003
S610242-ICV1
S610536-CCV1
S610537-CCV1

Laboratory Control Samples:

1621363 BS/BSD

SW846 8260C

Laboratory Control Samples:

1621363 BS/BSD

Ethanol percent recoveries (138/132) are outside individual acceptance criteria (70-130), but within overall method allowances. All reported results of the following samples are considered to have a potentially high bias:

Outfall 003

Tert-Butanol / butyl alcohol percent recoveries (126/131) are outside individual acceptance criteria (70-130), but within overall method allowances. All reported results of the following samples are considered to have a potentially high bias:

Outfall 003

Samples:

S610537-CCV1

Analyte percent drift is outside individual acceptance criteria (20), but within overall method allowances.

Ethanol (37.9%)

Tert-Butanol / butyl alcohol (25.6%)

This affected the following samples:

1621363-BLK1

1621363-BS1

1621363-BSD1

Outfall 003

SW846 8270D

Samples:

S610571-CCV1

Analyte percent drift is outside individual acceptance criteria (20), but within overall method allowances.

4-Nitrophenol (32.1%)

This affected the following samples:

1621331-BLK1

1621331-BS1

1621331-BSD1

SW846 8270D SIM

Laboratory Control Samples:

1621331 BS/BSD

Dibenzo (a,h) anthracene percent recoveries (409/376) are outside individual acceptance criteria (40-140), but within overall method allowances. All reported results of the following samples are considered to have a potentially high bias:

Chelsea Creek

Outfall 003

Samples:

S610531-CCV1

Analyte percent difference is outside individual acceptance criteria (20), but within overall method allowances.

Dibenzo (a,h) anthracene (423%)

SW846 8270D SIM

Samples:

S610531-CCV1

This affected the following samples:

1621331-BLK2

1621331-BS2

1621331-BSD2

Sample Acceptance Check Form

Client: Gulf Oil L.P.
Project: Gulf Terminal - Chelsea, MA / Gulf Chelsea
Work Order: SC29104
Sample(s) received on: 12/5/2016

The following outlines the condition of samples for the attached Chain of Custody upon receipt.

	<u>Yes</u>	<u>No</u>	<u>N/A</u>
Were custody seals present?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Were custody seals intact?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Were samples received at a temperature of $\leq 6^{\circ}\text{C}$?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Were samples cooled on ice upon transfer to laboratory representative?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Were samples refrigerated upon transfer to laboratory representative?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Were sample containers received intact?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Were samples properly labeled (labels affixed to sample containers and include sample ID, site location, and/or project number and the collection date)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Were samples accompanied by a Chain of Custody document?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Does Chain of Custody document include proper, full, and complete documentation, which shall include sample ID, site location, and/or project number, date and time of collection, collector's name, preservation type, sample matrix and any special remarks concerning the sample?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Did sample container labels agree with Chain of Custody document?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Were samples received within method-specific holding times?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Sample Acceptance Check Form

Client: Gulf Oil L.P.
Project: Gulf Terminal - Chelsea, MA / Gulf Chelsea
Work Order: SC29107
Sample(s) received on: 12/5/2016

The following outlines the condition of samples for the attached Chain of Custody upon receipt.

	<u>Yes</u>	<u>No</u>	<u>N/A</u>
Were custody seals present?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Were custody seals intact?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Were samples received at a temperature of $\leq 6^{\circ}\text{C}$?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Were samples cooled on ice upon transfer to laboratory representative?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Were samples refrigerated upon transfer to laboratory representative?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Were sample containers received intact?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Were samples properly labeled (labels affixed to sample containers and include sample ID, site location, and/or project number and the collection date)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Were samples accompanied by a Chain of Custody document?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Does Chain of Custody document include proper, full, and complete documentation, which shall include sample ID, site location, and/or project number, date and time of collection, collector's name, preservation type, sample matrix and any special remarks concerning the sample?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Did sample container labels agree with Chain of Custody document?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Were samples received within method-specific holding times?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Summary of Hits

Lab ID: SC29104-01

Client ID: Chelsea Creek

Parameter	Result	Flag	Reporting Limit	Units	Analytical Method
Lead	0.0150		0.0075	mg/l	EPA 200.7
Zinc	0.0446		0.0050	mg/l	EPA 200.7
Copper	0.0827	R01, D	0.0500	mg/l	EPA 200.8
Salinity	19.1		1.00	ppt (1000)	SM 2520 (01)
Total Solids	22600		100	mg/l	SM2540 B (11)
Total Suspended Solids	42.2		1.2	mg/l	SM2540D (11)
Total Organic Carbon	2.92		1.00	mg/l	SM5310B (00, 11)

Lab ID: SC29107-01

Client ID: Outfall 003

Parameter	Result	Flag	Reporting Limit	Units	Analytical Method
Copper	0.0152		0.0050	mg/l	EPA 200.7
Lead	0.0479		0.0075	mg/l	EPA 200.7
Nickel	0.0070		0.0050	mg/l	EPA 200.7
Zinc	0.0889		0.0050	mg/l	EPA 200.7
Chromium	0.00722	R01, D	0.00250	mg/l	EPA 200.8
Total Solids	248		5.00	mg/l	SM2540 B (11)
Total Suspended Solids	79.7		1.7	mg/l	SM2540D (11)
Total Organic Carbon	2.57		1.00	mg/l	SM5310B (00, 11)
Fluoranthene	0.056		0.051	µg/l	SW846 8270D SIM
Pyrene	0.072		0.051	µg/l	SW846 8270D SIM

Please note that because there are no reporting limits associated with hazardous waste characterizations or micro analyses, this summary does not include hits from these analyses if included in this work order.

Sample Identification

Chelsea Creek

SC29104-01

Client Project #

Gulf Chelsea

Matrix

Surface Water

Collection Date/Time

05-Dec-16 11:00

Received

05-Dec-16

<i>CAS No.</i>	<i>Analyte(s)</i>	<i>Result</i>	<i>Flag</i>	<i>Units</i>	<i>*RDL</i>	<i>MDL</i>	<i>Dilution</i>	<i>Method Ref.</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Analyst</i>	<i>Batch</i>	<i>Cert.</i>
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Volatile Organic CompoundsVolatile Organic Aromatics by SW846 8260Prepared by method SW846 5030 Water MS

71-43-2	Benzene	< 1.0		µg/l	1.0	0.3	1	SW846 8260C	07-Dec-16	07-Dec-16	GMA	1621362	
100-41-4	Ethylbenzene	< 1.0		µg/l	1.0	0.3	1	"	"	"	"	"	
91-20-3	Naphthalene	< 1.0		µg/l	1.0	0.3	1	"	"	"	"	"	
108-88-3	Toluene	< 1.0		µg/l	1.0	0.3	1	"	"	"	"	"	
179601-23-1	m,p-Xylene	< 2.0		µg/l	2.0	0.4	1	"	"	"	"	"	
95-47-6	o-Xylene	< 1.0		µg/l	1.0	0.5	1	"	"	"	"	"	

Surrogate recoveries:

460-00-4	4-Bromofluorobenzene	97			70-130 %			"	"	"	"	"	
2037-26-5	Toluene-d8	113			70-130 %			"	"	"	"	"	
17060-07-0	1,2-Dichloroethane-d4	116			70-130 %			"	"	"	"	"	
1868-53-7	Dibromofluoromethane	110			70-130 %			"	"	"	"	"	

Semivolatile Organic Compounds by GCMSSVOCs by SIMPrepared by method SW846 3510C

83-32-9	Acenaphthene	< 0.050		µg/l	0.050	0.030	1	SW846 8270D SIM	07-Dec-16	12-Dec-16	MSL	1621331	
208-96-8	Acenaphthylene	< 0.050		µg/l	0.050	0.032	1	"	"	"	"	"	
120-12-7	Anthracene	< 0.050		µg/l	0.050	0.026	1	"	"	"	"	"	
56-55-3	Benzo (a) anthracene	< 0.050		µg/l	0.050	0.024	1	"	"	"	"	"	
50-32-8	Benzo (a) pyrene	< 0.050		µg/l	0.050	0.036	1	"	"	"	"	"	
205-99-2	Benzo (b) fluoranthene	< 0.050		µg/l	0.050	0.035	1	"	"	"	"	"	
191-24-2	Benzo (g,h,i) perylene	< 0.050		µg/l	0.050	0.027	1	"	"	"	"	"	
207-08-9	Benzo (k) fluoranthene	< 0.050		µg/l	0.050	0.028	1	"	"	"	"	"	
218-01-9	Chrysene	< 0.050		µg/l	0.050	0.023	1	"	"	"	"	"	
53-70-3	Dibenzo (a,h) anthracene	< 0.050		µg/l	0.050	0.026	1	"	"	"	"	"	
206-44-0	Fluoranthene	< 0.050		µg/l	0.050	0.020	1	"	"	"	"	"	
86-73-7	Fluorene	< 0.050		µg/l	0.050	0.030	1	"	"	"	"	"	
193-39-5	Indeno (1,2,3-cd) pyrene	< 0.050		µg/l	0.050	0.022	1	"	"	"	"	"	
91-20-3	Naphthalene	< 0.050		µg/l	0.050	0.027	1	"	"	"	"	"	
85-01-8	Phenanthrene	< 0.050		µg/l	0.050	0.026	1	"	"	"	"	"	
129-00-0	Pyrene	< 0.050		µg/l	0.050	0.022	1	"	"	"	"	"	

Surrogate recoveries:

205440-82-0	Benzo (e) pyrene-d12	61			30-130 %			"	"	"	"	"	
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Total Metals by EPA 200/6000 Series MethodsPrepared by method General Prep-Metal

	Preservation	Field Preserved; pH<2 confirmed		N/A			1	EPA 200/6000 methods	10-Dec-16		BK	1621619	
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Total Metals by EPA 200 Series Methods

7440-43-9	Cadmium	< 0.0003	U	mg/l	0.0025	0.0003	1	EPA 200.7	09-Jan-17	09-Jan-17	edt	1700437	X
7440-50-8	Copper	0.0827	R01, D	mg/l	0.0500	0.00480	100	EPA 200.8	12-Dec-16	16-Dec-16	edt	1621627	X
7440-02-0	Nickel	< 0.0022	U	mg/l	0.0050	0.0022	1	EPA 200.7	09-Jan-17	09-Jan-17	edt	1700437	X
7439-92-1	Lead	0.0150		mg/l	0.0075	0.0027	1	"	"	"	"	"	X
7440-66-6	Zinc	0.0446		mg/l	0.0050	0.0022	1	"	"	"	"	"	X

General Chemistry Parameters*This laboratory report is not valid without an authorized signature on the cover page.*

Sample Identification

Chelsea Creek

SC29104-01

Client Project #

Gulf Chelsea

Matrix

Surface Water

Collection Date/Time

05-Dec-16 11:00

Received

05-Dec-16

<i>CAS No.</i>	<i>Analyte(s)</i>	<i>Result</i>	<i>Flag</i>	<i>Units</i>	<i>*RDL</i>	<i>MDL</i>	<i>Dilution</i>	<i>Method Ref.</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Analyst</i>	<i>Batch</i>	<i>Cert.</i>
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General Chemistry Parameters

7782-50-5	Total Residual Chlorine	< 0.028	U, R01,CIH T	mg/l	0.100	0.028	1	SM4500-Cl-G (11)	06-Dec-16 10:19	06-Dec-16 12:32	TY	1621261	X
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Prepared by method SM4500-NH3 B (11)

	Ammonia as N	< 0.200		mg/l	0.200	0.118	1	SM4500-NH3 C. (11)	13-Dec-16	13-Dec-16	EEM	1621748	X
	pH	8.09		pH Units			1	ASTM D 1293-99B	05-Dec-16 18:00	05-Dec-16 18:00	TY	1621235	X
	Salinity	19.1		ppt (1000)	1.00	0.144	1	SM 2520 (01)	06-Dec-16	06-Dec-16	BD	1621283	
	Total Solids	22,600		mg/l	100	30.6	1	SM2540 B (11)	06-Dec-16	10-Dec-16	CMB	1621248	
	Total Suspended Solids	42.2		mg/l	1.2	0.4	1	SM2540D (11)	06-Dec-16	07-Dec-16	CMB	1621249	X
	Total Organic Carbon	2.92		mg/l	1.00	0.246	1	SM5310B (00, 11)	06-Dec-16	06-Dec-16	RLT	1621253	X

Subcontracted analysesPrepared by method NA

Analysis performed by GZA Geoenvironmental, Inc. - Manchester, CT* -

	Aquatic Toxicity	See Report		N/A			1	EPA-821-R-02-0 12		29-Dec-16		'[none]'	
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This laboratory report is not valid without an authorized signature on the cover page.

Sample Identification**Outfall 003**

SC29107-01

Client Project #

Gulf Chelsea

Matrix

Surface Water

Collection Date/Time

05-Dec-16 11:00

Received

05-Dec-16

<i>CAS No.</i>	<i>Analyte(s)</i>	<i>Result</i>	<i>Flag</i>	<i>Units</i>	<i>*RDL</i>	<i>MDL</i>	<i>Dilution</i>	<i>Method Ref.</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Analyst</i>	<i>Batch</i>	<i>Cert.</i>
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Volatile Organic CompoundsVolatile Organic Compounds by SW846 8260Prepared by method SW846 5030 Water MS

71-43-2	Benzene	< 1.00		µg/l	1.00	0.28	1	SW846 8260C	07-Dec-16	08-Dec-16	GMA	1621363	
100-41-4	Ethylbenzene	< 1.00		µg/l	1.00	0.30	1	"	"	"	"	"	
1634-04-4	Methyl tert-butyl ether	< 1.00		µg/l	1.00	0.28	1	"	"	"	"	"	
91-20-3	Naphthalene	< 1.00		µg/l	1.00	0.35	1	"	"	"	"	"	
108-88-3	Toluene	< 1.00		µg/l	1.00	0.28	1	"	"	"	"	"	
75-01-4	Vinyl chloride	< 1.00		µg/l	1.00	0.51	1	"	"	"	"	"	
179601-23-1	m,p-Xylene	< 2.00		µg/l	2.00	0.38	1	"	"	"	"	"	
95-47-6	o-Xylene	< 1.00		µg/l	1.00	0.47	1	"	"	"	"	"	
75-65-0	Tert-Butanol / butyl alcohol	< 10.0		µg/l	10.0	5.98	1	"	"	"	"	"	
64-17-5	Ethanol	< 200		µg/l	200	23.6	1	"	"	"	"	"	

Surrogate recoveries:

460-00-4	4-Bromofluorobenzene	100			70-130 %			"	"	"	"	"	
2037-26-5	Toluene-d8	114			70-130 %			"	"	"	"	"	
17060-07-0	1,2-Dichloroethane-d4	112			70-130 %			"	"	"	"	"	
1868-53-7	Dibromofluoromethane	109			70-130 %			"	"	"	"	"	

Semivolatile Organic Compounds by GCMSAcid Extractables/PhenolsPrepared by method SW846 3510C

108-95-2	Phenol	< 0.993	U	µg/l	5.05	0.993	1	SW846 8270D	07-Dec-16	12-Dec-16	MSL	1621331	
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Surrogate recoveries:

367-12-4	2-Fluorophenol	33			15-110 %			"	"	"	"	"	
4165-62-2	Phenol-d5	24			15-110 %			"	"	"	"	"	

SVOCs by SIM

83-32-9	Acenaphthene	< 0.051		µg/l	0.051	0.031	1	SW846 8270D SIM	"	12-Dec-16	MSL	"	
208-96-8	Acenaphthylene	< 0.051		µg/l	0.051	0.032	1	"	"	"	"	"	
120-12-7	Anthracene	< 0.051		µg/l	0.051	0.027	1	"	"	"	"	"	
56-55-3	Benzo (a) anthracene	< 0.051		µg/l	0.051	0.024	1	"	"	"	"	"	
50-32-8	Benzo (a) pyrene	< 0.051		µg/l	0.051	0.036	1	"	"	"	"	"	
205-99-2	Benzo (b) fluoranthene	< 0.051		µg/l	0.051	0.035	1	"	"	"	"	"	
191-24-2	Benzo (g,h,i) perylene	< 0.051		µg/l	0.051	0.027	1	"	"	"	"	"	
207-08-9	Benzo (k) fluoranthene	< 0.051		µg/l	0.051	0.028	1	"	"	"	"	"	
218-01-9	Chrysene	< 0.051		µg/l	0.051	0.024	1	"	"	"	"	"	
53-70-3	Dibenzo (a,h) anthracene	< 0.051		µg/l	0.051	0.026	1	"	"	"	"	"	
206-44-0	Fluoranthene	0.056		µg/l	0.051	0.020	1	"	"	"	"	"	
86-73-7	Fluorene	< 0.051		µg/l	0.051	0.030	1	"	"	"	"	"	
193-39-5	Indeno (1,2,3-cd) pyrene	< 0.051		µg/l	0.051	0.022	1	"	"	"	"	"	
91-20-3	Naphthalene	< 0.051		µg/l	0.051	0.027	1	"	"	"	"	"	
85-01-8	Phenanthrene	< 0.051		µg/l	0.051	0.027	1	"	"	"	"	"	
129-00-0	Pyrene	0.072		µg/l	0.051	0.022	1	"	"	"	"	"	

Surrogate recoveries:

205440-82-0	Benzo (e) pyrene-d12	56			30-130 %			"	"	"	"	"	
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Total Metals by EPA 200/6000 Series MethodsPrepared by method General Prep-Metal*This laboratory report is not valid without an authorized signature on the cover page.*

Sample Identification**Outfall 003**

SC29107-01

Client Project #

Gulf Chelsea

Matrix

Surface Water

Collection Date/Time

05-Dec-16 11:00

Received

05-Dec-16

<i>CAS No.</i>	<i>Analyte(s)</i>	<i>Result</i>	<i>Flag</i>	<i>Units</i>	<i>*RDL</i>	<i>MDL</i>	<i>Dilution</i>	<i>Method Ref.</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Analyst</i>	<i>Batch</i>	<i>Cert.</i>
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Total Metals by EPA 200/6000 Series MethodsPrepared by method General Prep-Metal

Preservation	Field Preserved; pH<2 confirmed			N/A			1	EPA 200/6000 methods	10-Dec-16		BK	1621619	
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Total Metals by EPA 200 Series Methods

7440-43-9	Cadmium	< 0.0003	U	mg/l	0.0025	0.0003	1	EPA 200.7	09-Jan-17	09-Jan-17	edt	1700437	X
7440-47-3	Chromium	0.00722	R01, D	mg/l	0.00250	0.00133	5	EPA 200.8	16-Dec-16	18-Dec-16	edt	1622075	X
7440-50-8	Copper	0.0152		mg/l	0.0050	0.0023	1	EPA 200.7	09-Jan-17	09-Jan-17	edt	1700437	X
7440-02-0	Nickel	0.0070		mg/l	0.0050	0.0022	1	"	"	"	"	"	X
7439-92-1	Lead	0.0479		mg/l	0.0075	0.0027	1	"	"	"	"	"	X
7440-66-6	Zinc	0.0889		mg/l	0.0050	0.0022	1	"	"	"	"	"	X

General Chemistry Parameters

7782-50-5	Total Residual Chlorine	< 0.028	U, R01, CIH T	mg/l	0.100	0.028	1	SM4500-Cl-G (11)	06-Dec-16 10:19	06-Dec-16 12:34	TY	1621261	X
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Prepared by method SM4500-NH3 B (11)

Ammonia as N	< 0.200			mg/l	0.200	0.118	1	SM4500-NH3 C. (11)	13-Dec-16	13-Dec-16	EEM	1621748	X
pH	7.60			pH Units			1	ASTM D 1293-99B	05-Dec-16 18:00	05-Dec-16 18:00	TY	1621235	X
Salinity	< 1.00			ppt (1000)	1.00	0.144	1	SM 2520 (01)	06-Dec-16	06-Dec-16	BD	1621283	
Total Solids	248			mg/l	5.00	1.53	1	SM2540 B (11)	06-Dec-16	10-Dec-16	CMB	1621248	
Total Suspended Solids	79.7			mg/l	1.7	0.6	1	SM2540D (11)	06-Dec-16	07-Dec-16	CMB	1621249	X
Total Organic Carbon	2.57			mg/l	1.00	0.246	1	SM5310B (00, 11)	13-Dec-16	13-Dec-16	RLT	1621731	X

Microbiological Analyses

Fecal Coliforms	34	D		CFU/100 ml			2	SM 9222D-97	05-Dec-16 18:17	05-Dec-16 18:17	VIA	1621240	X
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Subcontracted analysesPrepared by method NA

Analysis performed by GZA Geoenvironmental, Inc. - Manchester, CT* -

Aquatic Toxicity	See report			N/A			1	EPA-821-R-02-012		29-Dec-16		'[none]'	
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Subcontracted AnalysesPrepared by method 369764

Analysis performed by Phoenix Environmental Labs, Inc. *- MACT007

Oil and Grease by EPA 1664A	< 1.4			mg/L	1.4	1.4	1	E1664A	"	13-Dec-16 12:15	MACT0	369764A	
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Volatile Organic Compounds - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 1621362 - SW846 5030 Water MS										
<u>Blank (1621362-BLK1)</u>					<u>Prepared & Analyzed: 07-Dec-16</u>					
Benzene	< 1.0		µg/l	1.0						
Ethylbenzene	< 1.0		µg/l	1.0						
Naphthalene	< 1.0		µg/l	1.0						
Toluene	< 1.0		µg/l	1.0						
m,p-Xylene	< 2.0		µg/l	2.0						
o-Xylene	< 1.0		µg/l	1.0						
Surrogate: 4-Bromofluorobenzene	49.6		µg/l		50.0		99	70-130		
Surrogate: Toluene-d8	54.3		µg/l		50.0		109	70-130		
Surrogate: 1,2-Dichloroethane-d4	53.9		µg/l		50.0		108	70-130		
Surrogate: Dibromofluoromethane	52.9		µg/l		50.0		106	70-130		
<u>LCS (1621362-BS1)</u>					<u>Prepared & Analyzed: 07-Dec-16</u>					
Benzene	18.3		µg/l		20.0		91	70-130		
Ethylbenzene	16.5		µg/l		20.0		83	70-130		
Naphthalene	17.9		µg/l		20.0		90	70-130		
Toluene	18.5		µg/l		20.0		92	70-130		
m,p-Xylene	16.6		µg/l		20.0		83	70-130		
o-Xylene	16.4		µg/l		20.0		82	70-130		
Surrogate: 4-Bromofluorobenzene	52.6		µg/l		50.0		105	70-130		
Surrogate: Toluene-d8	54.8		µg/l		50.0		110	70-130		
Surrogate: 1,2-Dichloroethane-d4	53.3		µg/l		50.0		107	70-130		
Surrogate: Dibromofluoromethane	54.9		µg/l		50.0		110	70-130		
<u>LCS Dup (1621362-BSD1)</u>					<u>Prepared & Analyzed: 07-Dec-16</u>					
Benzene	18.1		µg/l		20.0		91	70-130	0.7	20
Ethylbenzene	16.3		µg/l		20.0		81	70-130	2	20
Naphthalene	18.0		µg/l		20.0		90	70-130	0.6	20
Toluene	18.1		µg/l		20.0		91	70-130	2	20
m,p-Xylene	16.2		µg/l		20.0		81	70-130	2	20
o-Xylene	16.2		µg/l		20.0		81	70-130	1	20
Surrogate: 4-Bromofluorobenzene	51.8		µg/l		50.0		104	70-130		
Surrogate: Toluene-d8	54.1		µg/l		50.0		108	70-130		
Surrogate: 1,2-Dichloroethane-d4	51.7		µg/l		50.0		103	70-130		
Surrogate: Dibromofluoromethane	53.4		µg/l		50.0		107	70-130		
Batch 1621363 - SW846 5030 Water MS										
<u>Blank (1621363-BLK1)</u>					<u>Prepared & Analyzed: 07-Dec-16</u>					
Benzene	< 1.00		µg/l	1.00						
Ethylbenzene	< 1.00		µg/l	1.00						
Methyl tert-butyl ether	< 1.00		µg/l	1.00						
Naphthalene	< 1.00		µg/l	1.00						
Toluene	< 1.00		µg/l	1.00						
Vinyl chloride	< 1.00		µg/l	1.00						
m,p-Xylene	< 2.00		µg/l	2.00						
o-Xylene	< 1.00		µg/l	1.00						
Tert-Butanol / butyl alcohol	< 10.0		µg/l	10.0						
Ethanol	< 200		µg/l	200						
Surrogate: 4-Bromofluorobenzene	49.4		µg/l		50.0		99	70-130		
Surrogate: Toluene-d8	56.0		µg/l		50.0		112	70-130		
Surrogate: 1,2-Dichloroethane-d4	57.5		µg/l		50.0		115	70-130		
Surrogate: Dibromofluoromethane	52.8		µg/l		50.0		106	70-130		
<u>LCS (1621363-BS1)</u>					<u>Prepared & Analyzed: 07-Dec-16</u>					
Benzene	20.6		µg/l		20.0		103	70-130		

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Volatile Organic Compounds - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 1621363 - SW846 5030 Water MS										
<u>LCS (1621363-BS1)</u>					<u>Prepared & Analyzed: 07-Dec-16</u>					
Ethylbenzene	18.0		µg/l		20.0		90	70-130		
Methyl tert-butyl ether	20.3		µg/l		20.0		102	70-130		
Naphthalene	20.1		µg/l		20.0		100	70-130		
Toluene	20.5		µg/l		20.0		102	70-130		
Vinyl chloride	22.6		µg/l		20.0		113	70-130		
m,p-Xylene	17.8		µg/l		20.0		89	70-130		
o-Xylene	18.2		µg/l		20.0		91	70-130		
Tert-Butanol / butyl alcohol	251		µg/l		200		126	70-130		
Ethanol	552	QC2	µg/l		400		138	70-130		
Surrogate: 4-Bromofluorobenzene	50.9		µg/l		50.0		102	70-130		
Surrogate: Toluene-d8	55.7		µg/l		50.0		111	70-130		
Surrogate: 1,2-Dichloroethane-d4	53.6		µg/l		50.0		107	70-130		
Surrogate: Dibromofluoromethane	55.5		µg/l		50.0		111	70-130		
<u>LCS Dup (1621363-BS1)</u>					<u>Prepared & Analyzed: 07-Dec-16</u>					
Benzene	21.0		µg/l		20.0		105	70-130	2	20
Ethylbenzene	18.1		µg/l		20.0		91	70-130	0.5	20
Methyl tert-butyl ether	21.1		µg/l		20.0		106	70-130	4	20
Naphthalene	20.8		µg/l		20.0		104	70-130	3	20
Toluene	21.2		µg/l		20.0		106	70-130	3	20
Vinyl chloride	22.8		µg/l		20.0		114	70-130	0.8	20
m,p-Xylene	17.6		µg/l		20.0		88	70-130	1	20
o-Xylene	18.1		µg/l		20.0		91	70-130	0.2	20
Tert-Butanol / butyl alcohol	263	QM9	µg/l		200		131	70-130	4	20
Ethanol	530	QC2	µg/l		400		132	70-130	4	20
Surrogate: 4-Bromofluorobenzene	51.5		µg/l		50.0		103	70-130		
Surrogate: Toluene-d8	55.9		µg/l		50.0		112	70-130		
Surrogate: 1,2-Dichloroethane-d4	54.3		µg/l		50.0		109	70-130		
Surrogate: Dibromofluoromethane	55.5		µg/l		50.0		111	70-130		

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Semivolatile Organic Compounds by GCMS - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 1621331 - SW846 3510C										
<u>Blank (1621331-BLK1)</u>					<u>Prepared: 07-Dec-16 Analyzed: 08-Dec-16</u>					
Benzoic acid	< 1.99	U	µg/l	1.99						
4-Chloro-3-methylphenol	< 1.23	U	µg/l	1.23						
2-Chlorophenol	< 1.26	U	µg/l	1.26						
2,4-Dichlorophenol	< 1.21	U	µg/l	1.21						
2,4-Dimethylphenol	< 1.41	U	µg/l	1.41						
4,6-Dinitro-2-methylphenol	< 1.87	U	µg/l	1.87						
2,4-Dinitrophenol	< 2.15	U	µg/l	2.15						
2-Methylphenol	< 1.45	U	µg/l	1.45						
3 & 4-Methylphenol	< 1.45	U	µg/l	1.45						
2-Nitrophenol	< 1.45	U	µg/l	1.45						
4-Nitrophenol	< 2.92	U	µg/l	2.92						
Pentachlorophenol	< 1.87	U	µg/l	1.87						
Phenol	< 0.983	U	µg/l	0.983						
2,4,5-Trichlorophenol	< 1.19	U	µg/l	1.19						
2,4,6-Trichlorophenol	< 1.08	U	µg/l	1.08						
<i>Surrogate: 2-Fluorophenol</i>	<i>41.1</i>		µg/l		<i>50.0</i>		<i>82</i>	<i>15-110</i>		
<i>Surrogate: Phenol-d5</i>	<i>43.8</i>		µg/l		<i>50.0</i>		<i>88</i>	<i>15-110</i>		
<u>Blank (1621331-BLK2)</u>					<u>Prepared & Analyzed: 07-Dec-16</u>					
Acenaphthene	< 0.050		µg/l	0.050						
Acenaphthylene	< 0.050		µg/l	0.050						
Anthracene	< 0.050		µg/l	0.050						
Benzo (a) anthracene	< 0.050		µg/l	0.050						
Benzo (a) pyrene	< 0.050		µg/l	0.050						
Benzo (b) fluoranthene	< 0.050		µg/l	0.050						
Benzo (g,h,i) perylene	< 0.050		µg/l	0.050						
Benzo (k) fluoranthene	< 0.050		µg/l	0.050						
Chrysene	< 0.050		µg/l	0.050						
Dibenzo (a,h) anthracene	< 0.050		µg/l	0.050						
Fluoranthene	< 0.050		µg/l	0.050						
Fluorene	< 0.050		µg/l	0.050						
Indeno (1,2,3-cd) pyrene	< 0.050		µg/l	0.050						
Naphthalene	< 0.050		µg/l	0.050						
Phenanthrene	< 0.050		µg/l	0.050						
Pyrene	< 0.050		µg/l	0.050						
<i>Surrogate: Benzo (e) pyrene-d12</i>	<i>0.790</i>		µg/l		<i>1.00</i>		<i>79</i>	<i>30-130</i>		
<u>LCS (1621331-BS1)</u>					<u>Prepared: 07-Dec-16 Analyzed: 08-Dec-16</u>					
Benzoic acid	58.7		µg/l	1.99	50.0		117	30-130		
4-Chloro-3-methylphenol	55.2		µg/l	1.23	50.0		110	30-130		
2-Chlorophenol	49.4		µg/l	1.26	50.0		99	30-130		
2,4-Dichlorophenol	52.1		µg/l	1.21	50.0		104	30-130		
2,4-Dimethylphenol	50.0		µg/l	1.41	50.0		100	30-130		
4,6-Dinitro-2-methylphenol	56.9		µg/l	1.87	50.0		114	30-130		
2,4-Dinitrophenol	46.7		µg/l	2.15	50.0		93	30-130		
2-Methylphenol	50.1		µg/l	1.45	50.0		100	30-130		
3 & 4-Methylphenol	49.4		µg/l	1.45	50.0		99	30-130		
2-Nitrophenol	54.6		µg/l	1.45	50.0		109	30-130		
4-Nitrophenol	65.8	QC2	µg/l	2.92	50.0		132	30-130		
Pentachlorophenol	55.3		µg/l	1.87	50.0		111	30-130		
Phenol	48.4		µg/l	0.983	50.0		97	30-130		
2,4,5-Trichlorophenol	50.3		µg/l	1.19	50.0		101	30-130		
2,4,6-Trichlorophenol	50.5		µg/l	1.08	50.0		101	30-130		

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Semivolatile Organic Compounds by GCMS - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 1621331 - SW846 3510C										
<u>LCS (1621331-BS1)</u>					<u>Prepared: 07-Dec-16 Analyzed: 08-Dec-16</u>					
Surrogate: 2-Fluorophenol	38.6		µg/l		50.0		77	15-110		
Surrogate: Phenol-d5	39.5		µg/l		50.0		79	15-110		
<u>LCS (1621331-BS2)</u>					<u>Prepared & Analyzed: 07-Dec-16</u>					
Acenaphthene	0.726		µg/l	0.050	1.00		73	40-140		
Acenaphthylene	0.712		µg/l	0.050	1.00		71	40-140		
Anthracene	0.776		µg/l	0.050	1.00		78	40-140		
Benzo (a) anthracene	0.814		µg/l	0.050	1.00		81	40-140		
Benzo (a) pyrene	0.815		µg/l	0.050	1.00		82	40-140		
Benzo (b) fluoranthene	0.802		µg/l	0.050	1.00		80	40-140		
Benzo (g,h,i) perylene	0.804		µg/l	0.050	1.00		80	40-140		
Benzo (k) fluoranthene	0.794		µg/l	0.050	1.00		79	40-140		
Chrysene	0.882		µg/l	0.050	1.00		88	40-140		
Dibenzo (a,h) anthracene	4.09	QC2	µg/l	0.050	1.00		409	40-140		
Fluoranthene	0.886		µg/l	0.050	1.00		89	40-140		
Fluorene	0.726		µg/l	0.050	1.00		73	40-140		
Indeno (1,2,3-cd) pyrene	0.799		µg/l	0.050	1.00		80	40-140		
Naphthalene	0.747		µg/l	0.050	1.00		75	40-140		
Phenanthrene	0.877		µg/l	0.050	1.00		88	40-140		
Pyrene	0.900		µg/l	0.050	1.00		90	40-140		
Surrogate: Benzo (e) pyrene-d12	1.06		µg/l		1.00		106	30-130		
<u>LCS Dup (1621331-BSD1)</u>					<u>Prepared: 07-Dec-16 Analyzed: 08-Dec-16</u>					
Benzoic acid	59.8		µg/l	1.99	50.0		120	30-130	2	20
4-Chloro-3-methylphenol	54.0		µg/l	1.23	50.0		108	30-130	2	20
2-Chlorophenol	50.1		µg/l	1.26	50.0		100	30-130	1	20
2,4-Dichlorophenol	50.8		µg/l	1.21	50.0		102	30-130	3	20
2,4-Dimethylphenol	48.5		µg/l	1.41	50.0		97	30-130	3	20
4,6-Dinitro-2-methylphenol	56.6		µg/l	1.87	50.0		113	30-130	0.6	20
2,4-Dinitrophenol	46.0		µg/l	2.15	50.0		92	30-130	1	20
2-Methylphenol	49.2		µg/l	1.45	50.0		98	30-130	2	20
3 & 4-Methylphenol	48.8		µg/l	1.45	50.0		98	30-130	1	20
2-Nitrophenol	53.8		µg/l	1.45	50.0		108	30-130	1	20
4-Nitrophenol	66.9	QC2	µg/l	2.92	50.0		134	30-130	2	20
Pentachlorophenol	56.1		µg/l	1.87	50.0		112	30-130	1	20
Phenol	48.2		µg/l	0.983	50.0		96	30-130	0.3	20
2,4,5-Trichlorophenol	52.5		µg/l	1.19	50.0		105	30-130	4	20
2,4,6-Trichlorophenol	47.9		µg/l	1.08	50.0		96	30-130	5	20
Surrogate: 2-Fluorophenol	38.5		µg/l		50.0		77	15-110		
Surrogate: Phenol-d5	39.0		µg/l		50.0		78	15-110		
<u>LCS Dup (1621331-BSD2)</u>					<u>Prepared & Analyzed: 07-Dec-16</u>					
Acenaphthene	0.645		µg/l	0.050	1.00		64	40-140	12	20
Acenaphthylene	0.644		µg/l	0.050	1.00		64	40-140	10	20
Anthracene	0.695		µg/l	0.050	1.00		70	40-140	11	20
Benzo (a) anthracene	0.757		µg/l	0.050	1.00		76	40-140	7	20
Benzo (a) pyrene	0.755		µg/l	0.050	1.00		76	40-140	8	20
Benzo (b) fluoranthene	0.764		µg/l	0.050	1.00		76	40-140	5	20
Benzo (g,h,i) perylene	0.724		µg/l	0.050	1.00		72	40-140	10	20
Benzo (k) fluoranthene	0.770		µg/l	0.050	1.00		77	40-140	3	20
Chrysene	0.799		µg/l	0.050	1.00		80	40-140	10	20
Dibenzo (a,h) anthracene	3.76	QC2	µg/l	0.050	1.00		376	40-140	8	20
Fluoranthene	0.823		µg/l	0.050	1.00		82	40-140	7	20

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Semivolatile Organic Compounds by GCMS - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 1621331 - SW846 3510C										
<u>LCS Dup (1621331-BSD2)</u>					<u>Prepared & Analyzed: 07-Dec-16</u>					
Fluorene	0.661		µg/l	0.050	1.00		66	40-140	9	20
Indeno (1,2,3-cd) pyrene	0.728		µg/l	0.050	1.00		73	40-140	9	20
Naphthalene	0.677		µg/l	0.050	1.00		68	40-140	10	20
Phenanthrene	0.791		µg/l	0.050	1.00		79	40-140	10	20
Pyrene	0.832		µg/l	0.050	1.00		83	40-140	8	20
Surrogate: Benzo (e) pyrene-d12	1.02		µg/l		1.00		102	30-130		

Total Metals by EPA 200 Series Methods - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 1621627 - EPA 200 Series										
<u>Blank (1621627-BLK1)</u>										<u>Prepared: 12-Dec-16 Analyzed: 16-Dec-16</u>
Copper	< 0.00005	U	mg/l	0.00005						
<u>LCS (1621627-BS1)</u>										<u>Prepared: 12-Dec-16 Analyzed: 16-Dec-16</u>
Copper	0.0554	D	mg/l	0.00048	0.0500		111	85-115		
<u>Duplicate (1621627-DUP1)</u>										<u>Prepared: 12-Dec-16 Analyzed: 16-Dec-16</u>
Copper	0.0791	R01, D	mg/l	0.00480		0.0827			4	20
<u>Matrix Spike (1621627-MS1)</u>										<u>Prepared: 12-Dec-16 Analyzed: 16-Dec-16</u>
Copper	0.107	QM5, D	mg/l	0.00480	0.0500	0.0827	48	70-130		
Batch 1622075 - EPA 200 Series										
<u>Blank (1622075-BLK1)</u>										<u>Prepared: 16-Dec-16 Analyzed: 18-Dec-16</u>
Chromium	< 0.00027	U	mg/l	0.00027						
<u>LCS (1622075-BS1)</u>										<u>Prepared: 16-Dec-16 Analyzed: 18-Dec-16</u>
Chromium	0.0949	D	mg/l	0.00266	0.100		95	85-115		
<u>Duplicate (1622075-DUP1)</u>										<u>Prepared: 16-Dec-16 Analyzed: 18-Dec-16</u>
Chromium	0.00884	R01, D	mg/l	0.00133		0.00722			20	20
<u>Matrix Spike (1622075-MS1)</u>										<u>Prepared: 16-Dec-16 Analyzed: 18-Dec-16</u>
Chromium	0.0936	D	mg/l	0.00266	0.100	0.00722	86	70-130		
<u>Post Spike (1622075-PS1)</u>										<u>Prepared: 16-Dec-16 Analyzed: 18-Dec-16</u>
Chromium	0.102	D	mg/l	0.00266	0.100	0.00722	94	85-115		
Batch 1700437 - EPA 200 Series										
<u>Blank (1700437-BLK1)</u>										<u>Prepared & Analyzed: 09-Jan-17</u>
Nickel	< 0.0022	U	mg/l	0.0022						
Zinc	0.0049	J	mg/l	0.0022						
Lead	< 0.0075		mg/l	0.0075						
Cadmium	< 0.0003	U	mg/l	0.0003						
Copper	< 0.0023	U	mg/l	0.0023						
<u>LCS (1700437-BS1)</u>										<u>Prepared & Analyzed: 09-Jan-17</u>
Nickel	1.32		mg/l	0.0022	1.25		105	85-115		
Lead	1.29		mg/l	0.0075	1.25		104	85-115		
Zinc	1.31		mg/l	0.0022	1.25		105	85-115		
Cadmium	1.29		mg/l	0.0003	1.25		103	85-115		
Copper	1.37		mg/l	0.0023	1.25		110	85-115		
<u>Duplicate (1700437-DUP1)</u>										<u>Prepared & Analyzed: 09-Jan-17</u>
Zinc	0.0866		mg/l	0.0022		0.0889			3	20
Lead	0.0464		mg/l	0.0075		0.0479			3.07	20
Nickel	0.0066		mg/l	0.0022		0.0070			5	20
Copper	0.0147		mg/l	0.0023		0.0152			3	20
Cadmium	< 0.0003	U	mg/l	0.0003		BRL				20
<u>Matrix Spike (1700437-MS1)</u>										<u>Prepared & Analyzed: 09-Jan-17</u>
Lead	1.19		mg/l	0.0075	1.25	0.0479	91.6	70-130		
Zinc	1.27		mg/l	0.0022	1.25	0.0889	94	70-130		
Nickel	1.17		mg/l	0.0022	1.25	0.0070	93	70-130		
Copper	1.24		mg/l	0.0023	1.25	0.0152	98	70-130		
Cadmium	1.16		mg/l	0.0003	1.25	BRL	93	70-130		
<u>Post Spike (1700437-PS1)</u>										<u>Prepared & Analyzed: 09-Jan-17</u>
Lead	1.33		mg/l	0.0075	1.25	0.0479	103	85-115		
Nickel	1.31		mg/l	0.0022	1.25	0.0070	104	85-115		
Zinc	1.39		mg/l	0.0022	1.25	0.0889	104	85-115		
Copper	1.35		mg/l	0.0023	1.25	0.0152	107	85-115		
Cadmium	1.28		mg/l	0.0003	1.25	BRL	103	85-115		

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General Chemistry Parameters - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 1621235 - General Preparation										
<u>Reference (1621235-SRM1)</u>	<u>Prepared & Analyzed: 05-Dec-16</u>									
pH	6.03		pH Units		6.00		100	97.5-102.5		
<u>Reference (1621235-SRM2)</u>	<u>Prepared & Analyzed: 05-Dec-16</u>									
pH	6.03		pH Units		6.00		100	97.5-102.5		
Batch 1621248 - General Preparation										
<u>Blank (1621248-BLK1)</u>	<u>Prepared: 06-Dec-16 Analyzed: 10-Dec-16</u>									
Total Solids	< 5.00		mg/l	5.00						
<u>LCS (1621248-BS1)</u>	<u>Prepared: 06-Dec-16 Analyzed: 10-Dec-16</u>									
Total Solids	1190		mg/l	10.0	1100		108	90-110		
<u>Duplicate (1621248-DUP1)</u>	<u>Source: SC29107-01 Prepared: 06-Dec-16 Analyzed: 10-Dec-16</u>									
Total Solids	241		mg/l	5.00		248			3	5
Batch 1621249 - General Preparation										
<u>Blank (1621249-BLK1)</u>	<u>Prepared: 06-Dec-16 Analyzed: 07-Dec-16</u>									
Total Suspended Solids	< 0.5		mg/l	0.5						
<u>LCS (1621249-BS1)</u>	<u>Prepared: 06-Dec-16 Analyzed: 07-Dec-16</u>									
Total Suspended Solids	108		mg/l	10.0	100		108	90-110		
Batch 1621253 - General Preparation										
<u>Blank (1621253-BLK1)</u>	<u>Prepared & Analyzed: 06-Dec-16</u>									
Total Organic Carbon	< 1.00		mg/l	1.00						
<u>LCS (1621253-BS1)</u>	<u>Prepared & Analyzed: 06-Dec-16</u>									
Total Organic Carbon	16.2		mg/l	1.00	15.0		108	85-115		
<u>Calibration Blank (1621253-CCB1)</u>	<u>Prepared & Analyzed: 06-Dec-16</u>									
Total Organic Carbon	0.167		mg/l							
<u>Calibration Blank (1621253-CCB2)</u>	<u>Prepared & Analyzed: 06-Dec-16</u>									
Total Organic Carbon	0.491		mg/l							
<u>Calibration Blank (1621253-CCB3)</u>	<u>Prepared & Analyzed: 06-Dec-16</u>									
Total Organic Carbon	0.178		mg/l							
<u>Calibration Check (1621253-CCV1)</u>	<u>Prepared & Analyzed: 06-Dec-16</u>									
Total Organic Carbon	16.2		mg/l	1.00	15.0		108	85-115		
<u>Calibration Check (1621253-CCV2)</u>	<u>Prepared & Analyzed: 06-Dec-16</u>									
Total Organic Carbon	16.7		mg/l	1.00	15.0		111	85-115		
<u>Calibration Check (1621253-CCV3)</u>	<u>Prepared & Analyzed: 06-Dec-16</u>									
Total Organic Carbon	16.2		mg/l	1.00	15.0		108	85-115		
<u>Reference (1621253-SRM1)</u>	<u>Prepared & Analyzed: 06-Dec-16</u>									
Total Organic Carbon	9.32		mg/l	1.00	9.99		93	81.4-122.1		
Batch 1621261 - General Preparation										
<u>Blank (1621261-BLK1)</u>	<u>Prepared & Analyzed: 06-Dec-16</u>									
Total Residual Chlorine	< 0.006	U	mg/l	0.006						
<u>LCS (1621261-BS1)</u>	<u>Prepared & Analyzed: 06-Dec-16</u>									
Total Residual Chlorine	0.051		mg/l	0.006	0.0500		103	90-110		
<u>Duplicate (1621261-DUP1)</u>	<u>Source: SC29104-01 Prepared & Analyzed: 06-Dec-16</u>									
Total Residual Chlorine	< 0.028	R01, U	mg/l	0.028		BRL				20
<u>Matrix Spike (1621261-MS1)</u>	<u>Source: SC29104-01 Prepared & Analyzed: 06-Dec-16</u>									
Total Residual Chlorine	0.184	QM7	mg/l	0.028	0.250	BRL	73	80-120		
<u>Matrix Spike Dup (1621261-MSD1)</u>	<u>Source: SC29104-01 Prepared & Analyzed: 06-Dec-16</u>									
Total Residual Chlorine	0.187	QM7	mg/l	0.028	0.250	BRL	75	80-120	2	200
<u>Reference (1621261-SRM1)</u>	<u>Prepared & Analyzed: 06-Dec-16</u>									
Total Residual Chlorine	0.112		mg/l	0.006	0.112		99	85-115		

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General Chemistry Parameters - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 1621283 - General Preparation										
<u>Duplicate (1621283-DUP1)</u>										
Salinity	19.3		ppt (1000)	1.00		19.1			1	10
<u>Reference (1621283-SRM1)</u>										
Salinity	9.94		ppt (1000)	1.00	10.0		99	90-110		
<u>Reference (1621283-SRM2)</u>										
Salinity	10.1		ppt (1000)	1.00	10.0		101	90-110		
Batch 1621731 - General Preparation										
<u>Blank (1621731-BLK1)</u>										
Total Organic Carbon	< 1.00		mg/l	1.00						
<u>LCS (1621731-BS1)</u>										
Total Organic Carbon	15.2		mg/l	1.00	15.0		101	85-115		
<u>Calibration Blank (1621731-CCB1)</u>										
Total Organic Carbon	0.142		mg/l							
<u>Calibration Blank (1621731-CCB2)</u>										
Total Organic Carbon	0.173		mg/l							
<u>Calibration Blank (1621731-CCB3)</u>										
Total Organic Carbon	0.209		mg/l							
<u>Calibration Blank (1621731-CCB4)</u>										
Total Organic Carbon	0.199		mg/l							
<u>Calibration Blank (1621731-CCB5)</u>										
Total Organic Carbon	0.0898		mg/l							
<u>Calibration Check (1621731-CCV1)</u>										
Total Organic Carbon	15.4		mg/l	1.00	15.0		103	85-115		
<u>Calibration Check (1621731-CCV2)</u>										
Total Organic Carbon	15.7		mg/l	1.00	15.0		105	85-115		
<u>Calibration Check (1621731-CCV3)</u>										
Total Organic Carbon	15.0		mg/l	1.00	15.0		100	85-115		
<u>Calibration Check (1621731-CCV4)</u>										
Total Organic Carbon	15.6		mg/l	1.00	15.0		104	85-115		
<u>Calibration Check (1621731-CCV5)</u>										
Total Organic Carbon	15.2		mg/l	1.00	15.0		101	85-115		
<u>Reference (1621731-SRM1)</u>										
Total Organic Carbon	9.44		mg/l	1.00	9.99		94	81.4-122.1		
Batch 1621748 - General Preparation										
<u>Blank (1621748-BLK1)</u>										
Ammonia as N	< 0.200		mg/l	0.200						
<u>LCS (1621748-BS1)</u>										
Ammonia as N	4.90		mg/l	0.200	5.00		98	90-110		
<u>Reference (1621748-SRM1)</u>										
Ammonia as N	1.12		mg/l	0.200	1.02		110	86-114		

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Subcontracted Analyses - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 369764A - 369764										
<u>BLK (BV99434-BLK)</u>					<u>Prepared & Analyzed: 13-Dec-16</u>					
Oil and Grease by EPA 1664A	< 1.4		mg/L	1.4	40			-		
<u>LCS (BV99434-LCS)</u>					<u>Prepared: Analyzed: 13-Dec-16</u>					
Oil and Grease by EPA 1664A	40.20		mg/L	1.4	40		101	85-115		20

Notes and Definitions

D	Data reported from a dilution
J	Detected above the Method Detection Limit but below the Reporting Limit; therefore, result is an estimated concentration (CLP J-Flag).
QC2	Analyte out of acceptance range in QC spike but no reportable concentration present in sample.
QM5	The spike recovery was outside acceptance limits for the MS, MSD and/or PS due to matrix interference. The LCS and/or LCSD were within acceptance limits showing that the laboratory is in control and the data is acceptable.
QM7	The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.
QM9	The spike recovery for this QC sample is outside the established control limits. The sample results for the QC batch were accepted based on LCS/LCSD or SRM recoveries within the control limits.
R01	The Reporting Limit has been raised to account for matrix interference.
U	Analyte included in the analysis, but not detected at or above the MDL.
dry	Sample results reported on a dry weight basis
NR	Not Reported
RPD	Relative Percent Difference
CIHT	The method for residual chlorine indicates that samples should be analyzed immediately. 40 CFR 136 specifies a holding time of 15 minutes from sampling to analysis. Therefore all aqueous residual chlorine samples not analyzed in the field are considered out of hold time at the time of sample receipt.
OG	The required Matrix Spike and Matrix Spike Duplicate (MS/MSD) for Oil & Grease method 1664B can only be analyzed when the client has submitted sufficient sample volume. An extra liter per MS/MSD is required to fulfill the method QC criteria. Please refer to Chain of Custody and QC Summary (MS/MSD) of the Laboratory Report to verify ample sample volume was submitted to fulfill the requirement.
pH	The method for pH does not stipulate a specific holding time other than to state that the samples should be analyzed as soon as possible. For aqueous samples the 40 CFR 136 specifies a holding time of 15 minutes from sampling to analysis. Therefore all aqueous pH samples not analyzed in the field are considered out of hold time at the time of sample receipt. All soil samples are analyzed as soon as possible after sample receipt.
LIV	The initial volume for this sample has been reduced due to sample matrix and/or historical data therefore elevating the reporting limit.

Laboratory Control Sample (LCS): A known matrix spiked with compound(s) representative of the target analytes, which is used to document laboratory performance.

Matrix Duplicate: An intra-laboratory split sample which is used to document the precision of a method in a given sample matrix.

Matrix Spike: An aliquot of a sample spiked with a known concentration of target analyte(s). The spiking occurs prior to sample preparation and analysis. A matrix spike is used to document the bias of a method in a given sample matrix.

Method Blank: An analyte-free matrix to which all reagents are added in the same volumes or proportions as used in sample processing. The method blank should be carried through the complete sample preparation and analytical procedure. The method blank is used to document contamination resulting from the analytical process.

Method Detection Limit (MDL): The minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix type containing the analyte.

Reportable Detection Limit (RDL): The lowest concentration that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions. For many analytes the RDL analyte concentration is selected as the lowest non-zero standard in the calibration curve. While the RDL is approximately 5 to 10 times the MDL, the RDL for each sample takes into account the sample volume/weight, extract/digestate volume, cleanup procedures and, if applicable, dry weight correction. Sample RDLs are highly matrix-dependent.

Surrogate: An organic compound which is similar to the target analyte(s) in chemical composition and behavior in the analytical process, but which is not normally found in environmental samples. These compounds are spiked into all blanks, standards, and samples prior to analysis. Percent recoveries are calculated for each surrogate.

Continuing Calibration Verification: The calibration relationship established during the initial calibration must be verified at periodic intervals. Concentrations, intervals, and criteria are method specific.



New England Bioassay

A Division of GZA

GEOTECHNICAL

ENVIRONMENTAL

ECOLOGICAL

WATER

CONSTRUCTION
MANAGEMENT

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ACUTE AQUATIC TOXICITY TEST REPORT

**Gulf Oil Terminal
Chelsea, MA**

Test Start Date: 12/6/16

Test Period: December 2016

Report Prepared by:

New England Bioassay
A Division of GZA GeoEnvironmental, Inc.
77 Batson Dr.
Manchester, CT 06042

NEB Project Number: 05.0045469.00

Report Date: December 29, 2016

Report Submitted to:

Eurofins Spectrum Analytical, Inc.
11 Almgren Drive
Agawam, MA 01001

Sample ID: SC29107-01/SC29104-01

If you have any questions concerning these results, please contact the
Lab Manager, Kim Wills, at (860) 858-3153 or kimberly.wills@gza.com.

Whole Effluent Toxicity Testing Report Instruction Form

Client Name/Project: Spectrum / Gulf Oil Terminal Test Date: 12/6/16

Sample ID: SC29107-01/SC29104-01

Your results were as follows:

☒ Monitoring Only

- ☐ Fail – Please proceed according to the instructions in your permit.
- ☐ Invalid – **Retesting is still required. Retest report will be sent at a later date under separate cover.**
- ☐ Original Test Invalid – **Valid retest performed. Both test and retest results are attached.**
- ☐ Retesting will be or has been performed according to the Case 1 Protocols outlined in the attached copy of EPA-New England's species-specific, self-implementing policy for alternate dilution water.
- ☐ This is your _____ case of dilution water toxicity. Please proceed according to the Case 2 Protocols outlined in the attached copy of EPA-New England's species-specific, self-implementing policy for alternate dilution water. The alternate dilution water you select for future tests for this species should be described as follows: "synthetic laboratory water made up according to EPA's toxicity test protocols, by adding specified amounts of salts into deionized water in order to match the hardness of our receiving water." Writing this letter should help you to avoid retests in the future.
- ☐ Available information is insufficient to determine whether this test passed or failed. Please compare results to your permit limits. Please submit a current copy of your permit to the NEB Lab so that we can determine the status of future tests results and help ensure your compliance with permit requirements.

Please complete the items on this list before reporting these results according to the instructions in the "Monitoring and Reporting" Section of your permit.

- Please complete, sign and date the upper portion of the "Whole Effluent Toxicity Test Report Certification" page which is the page directly following this page.
- Fill in the Sample Type and Sample Method (upper right) and the Permit Limits (lower left) on the New England Bioassay - EPA Toxicity Test Summary Sheet(s) if they are incomplete.
- Fill in any missing information on the NEB Chain-of-Custody documents. This includes ensuring that the following information is recorded: Sampler's name and title, Facility name and address, Sample collection methods, Sample collection start and end dates and times, Types of sample, Chlorination status of samples upon shipment to NEB, Site description and Sample collection procedures.
- Monitoring results should be summarized on your monthly Discharge Monitoring Report Form.
- Signed and dated originals of this report must be submitted to the State (and Federal) Agencies specified in the "Monitoring and Reporting" section of your permit.

Questions? Please contact the Lab Manager, Kim Wills, at (860) 858-3153 or kimberly.wills@gza.com.

WHOLE EFFLUENT TOXICITY TEST REPORT CERTIFICATION (Permittee)

I certify under penalty of law that this document and all ATTACHMENTS were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Executed on _____

[Date]

[Authorized Signature]

[Print or Type Name and Title]

[Print or Type the Permittee's Name]

[Print or Type the NPDES Permit No.]

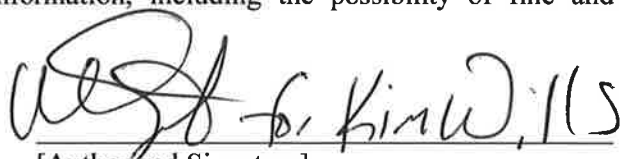
Since the WET test and report check is complicated, the New England Bioassay Aquatic Toxicity Laboratory has certified the validity of the WET test data in the section below. Please note that this does not relieve the permittee from its responsibility to sign and certify the report under 40 C.F.R. S 122.41(k).

WHOLE EFFLUENT TOXICITY TEST REPORT CERTIFICATION (Bioassay Laboratory)

I certify under penalty of law that this document and all ATTACHMENTS were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Executed on _____

[Date]


[Authorized Signature]

Kim Wills, Laboratory Manager

[Print or Type Name and Title]

New England Bioassay

[Print or Type Name of Bioassay Laboratory]

24. Telephone Contacts

If you have questions, please contact Joy Hilton, Water Technical Unit, at (617) 918-1877 or David McDonald, Ecosystem Assessment Unit, at (617) 918-8609.

NEW ENGLAND BIOASSAY, A DIVISION OF GZA EPA TEST SUMMARY SHEET

Facility Name: Gulf Oil Terminal Test Start Date: 12/6/16
 NPDES Permit Number: MA0001091 Outfall Number: 003

<u>Test Type</u>	<u>Test Species</u>	<u>Sample Type</u>	<u>Sample Method</u>
<input checked="" type="checkbox"/> Acute	<input type="checkbox"/> Fathead Minnow	<input type="checkbox"/> Prechlorinated	<input checked="" type="checkbox"/> Grab
<input type="checkbox"/> Chronic	<input type="checkbox"/> Ceriodaphnia Dubia	<input type="checkbox"/> Dechlorinated	<input type="checkbox"/> Composite
<input type="checkbox"/> Modified	<input type="checkbox"/> Daphnia Pulex	<input type="checkbox"/> Unchlorinated	<input type="checkbox"/> Flow-thru
<input type="checkbox"/> (Chronic reporting LC50 values)	<input checked="" type="checkbox"/> Mysid Shrimp	<input type="checkbox"/> Chlorinated	<input type="checkbox"/> Other
<input type="checkbox"/> 24-Hour Screening	<input type="checkbox"/> Sheepshead		
	<input type="checkbox"/> Menidia		
	<input type="checkbox"/> Sea Urchin	TRC conc. <u>0.086</u> mg/L	
	<input type="checkbox"/> Selenastrum		
	<input type="checkbox"/> Other _____		

Dilution Water

☒ Receiving water collected at a point immediately upstream of or away from the discharge;
 (Receiving water name and sampling location: Chelsea River)
☐ Alternate Surface Water of known quality and a hardness to generally reflect the characteristics
 of the receiving water; (Surface water name: _____)
☐ Synthetic water prepared using either Millipore Mill-Q or equivalent deionized water and
 reagent grade chemicals; or deionized water combined with mineral water;
☐ Artificial sea salts mixed with deionized water;
☐ Other _____

Effluent Sampling Date(s): 12/5/16

Effluent Concentrations Tested (in%): 0 6.25 12.5 25 50 100

* (Permit Limit Concentration): monitoring only

Was effluent salinity adjusted? Yes If yes, to what value? 25 ppt

Reference Toxicant test date: 11/1/16 Reference Toxicant Test Acceptable: Yes ☒ No ☐

Age and Age Range of Test Organisms 4 days (< 24 hours) Source of Organisms NEB

TEST RESULTS & PERMIT LIMITS

Test Acceptability Criteria

A. Synthetic Water Control

Mean Control Survival: 100%

Mean Control Reproduction: N/A

Mean Control Weight: N/A

Mean Control % Fertilization: N/A

B. Receiving Water Control

Mean Control Survival: 100%

Mean Control Reproduction: N/A

Mean Control Weight: N/A

Mean Control % Fertilization: N/A

C. Lab Culture Control Yes ☐ No ☒

D. Thiosulfate Control Yes ☐ No ☒

Test Variability

Test PMSD (growth) N/A

Test PMSD (reproduction.) N/A

Permit Limits & Test Results

	<u>Limits</u>		<u>Results</u>
LC50	<u>N/A</u>	LC50	<u>>100%</u>
		Upper Value	<u>$\pm\infty$</u>
		Lower Value	<u>100%</u>
		Data Analysis	
		Method Used	<u>Graphical</u>
A-NOEC	<u>N/A</u>	A-NOEC	<u>100%</u>
C-NOEC	<u>N/A</u>	C-NOEC	<u>N/A</u>
		LOEC	<u>N/A</u>
IC25	<u>N/A</u>	IC25	<u>-----</u>
IC50	<u>N/A</u>	IC50	<u>-----</u>

PMSD Comparison Discussion – N/A

Concentration-Response Evaluation

The concentration-response relationship observed in this data set corresponds to the following item number in Chapter Four of “Method Guidance and Recommendations for Whole Effluent Toxicity (WET) Testing (40 CFR Part 136)”, EPA 821-B-00-004, July 2000:

- ☒ 1. Ideal concentration-response relationship
- ☐ 2. All or nothing response
- ☐ 3. Stimulatory response at low concentrations and detrimental effects at higher concentrations
- ☐ 4. Stimulation at low concentrations but no significant effect at higher concentrations
- ☐ 5. Interrupted concentration-response: significant effects bracketed by non-significant effects
- ☐ 6. Interrupted concentration-response: non-significant effects bracketed by significant effects
- ☐ 7. Significant effects only at highest concentration
- ☐ 8. Significant effects at all test concentrations but flat concentration-response curve
- ☐ 9. Significant effects at all test concentrations with a sloped concentration-response curve
- ☐ 10. Inverse concentration-response relationship

The concentration-response relationship was reviewed according to the above guidance document and the following determination was made:

- ☒ 1. Results are reliable and should be reported.
- ☐ 2. Results are anomalous. An explanation is provided in the body of the report.
- ☐ 3. Results are inconclusive and the test should be repeated with a newly collected sample. An explanation is provided in the body of the report.

NEW ENGLAND BIOASSAY, A DIVISION OF GZA EPA TEST SUMMARY SHEET

Facility Name: Gulf Oil Terminal Test Start Date: 12/6/16
 NPDES Permit Number: MA0001091 Outfall Number: 003

<u>Test Type</u>	<u>Test Species</u>	<u>Sample Type</u>	<u>Sample Method</u>
<input checked="" type="checkbox"/> Acute	<input type="checkbox"/> Fathead Minnow	<input type="checkbox"/> Prechlorinated	<input checked="" type="checkbox"/> Grab
<input type="checkbox"/> Chronic	<input type="checkbox"/> Ceriodaphnia Dubia	<input type="checkbox"/> Dechlorinated	<input type="checkbox"/> Composite
<input type="checkbox"/> Modified	<input type="checkbox"/> Daphnia Pulex	<input type="checkbox"/> Unchlorinated	<input type="checkbox"/> Flow-thru
(Chronic reporting	<input type="checkbox"/> Mysid Shrimp	<input type="checkbox"/> Chlorinated	<input type="checkbox"/> Other
LC50 values)	<input type="checkbox"/> Sheepshead		
<input type="checkbox"/> 24-Hour Screening	<input checked="" type="checkbox"/> Menidia	TRC conc. <u>0.086</u> mg/L	
	<input type="checkbox"/> Sea Urchin		
	<input type="checkbox"/> Selenastrum		
	<input type="checkbox"/> Other _____		

Dilution Water

☒ Receiving water collected at a point immediately upstream of or away from the discharge;
 (Receiving water name and sampling location: Chelsea River)
☐ Alternate Surface Water of known quality and a hardness to generally reflect the characteristics
 of the receiving water; (Surface water name: _____)
☐ Synthetic water prepared using either Millipore Mill-Q or equivalent deionized water and
 reagent grade chemicals; or deionized water combined with mineral water;
☐ Artificial sea salts mixed with deionized water;
☐ Other _____

Effluent Sampling Date(s): 12/5/16

Effluent Concentrations Tested (in%): 0 6.25 12.5 25 50 100
 * (Permit Limit Concentration): monitoring only

Was effluent salinity adjusted? Yes If yes, to what value? 25 ppt

Reference Toxicant test date: 12/1/16 Reference Toxicant Test Acceptable: Yes ☒ No ☐

Age and Age Range of Test Organisms 11 days (<24 hours) Source of Organisms AB

TEST RESULTS & PERMIT LIMITS

Test Acceptability Criteria

A. Synthetic Water Control

Mean Control Survival: <u>90%</u>	Mean Control Reproduction: <u>N/A</u>
Mean Control Weight: <u>N/A</u>	Mean Control % Fertilization: <u>N/A</u>

B. Receiving Water Control

Mean Control Survival: <u>95%</u>	Mean Control Reproduction: <u>N/A</u>
Mean Control Weight: <u>N/A</u>	Mean Control % Fertilization: <u>N/A</u>

C. Lab Culture Control Yes ☐ No ☒

D. Thiosulfate Control Yes ☐ No ☒

Test Variability

Test PMSD (growth) N/A
 Test PMSD (reproduction.) N/A

Permit Limits & Test Results

<u>Limits</u>		<u>Results</u>	
LC50	<u>N/A</u>	LC50	<u>>100%</u>
		Upper Value	<u>$\pm\infty$</u>
		Lower Value	<u>100%</u>
		Data Analysis	
		Method Used	<u>Graphical</u>
A-NOEC	<u>N/A</u>	A-NOEC	<u>100%</u>
C-NOEC	<u>N/A</u>	C-NOEC	<u>N/A</u>
		LOEC	<u>N/A</u>
IC25	<u>N/A</u>	IC25	<u>-----</u>
IC50	<u>N/A</u>	IC50	<u>-----</u>

PMSD Comparison Discussion – N/A

Concentration-Response Evaluation

The concentration-response relationship observed in this data set corresponds to the following item number in Chapter Four of “Method Guidance and Recommendations for Whole Effluent Toxicity (WET) Testing (40 CFR Part 136)”, EPA 821-B-00-004, July 2000:

- ☒ 1. Ideal concentration-response relationship
- ☐ 2. All or nothing response
- ☐ 3. Stimulatory response at low concentrations and detrimental effects at higher concentrations
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- ☐ 5. Interrupted concentration-response: significant effects bracketed by non-significant effects
- ☐ 6. Interrupted concentration-response: non-significant effects bracketed by significant effects
- ☐ 7. Significant effects only at highest concentration
- ☐ 8. Significant effects at all test concentrations but flat concentration-response curve
- ☐ 9. Significant effects at all test concentrations with a sloped concentration-response curve
- ☐ 10. Inverse concentration-response relationship

The concentration-response relationship was reviewed according to the above guidance document and the following determination was made:

- ☒ 1. Results are reliable and should be reported.
- ☐ 2. Results are anomalous. An explanation is provided in the body of the report.
- ☐ 3. Results are inconclusive and the test should be repeated with a newly collected sample. An explanation is provided in the body of the report.

MYSIDOPSIS BAHIA AQUATIC TOXICITY TEST REPORT

Test Reference Manual: EPA 821-R-02-012, "Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater Organisms and Marine Organisms", Fifth Edition

Test Method: *Mysidopsis bahia* Acute Toxicity Test – Method 2007.0

Test Type: Acute Static Non-Renewal Saltwater Test

Salinity: 25 ppt \pm 10% for all dilutions by dry ocean salts (Instant Ocean)

Temperature : 25 \pm 1°C

Light Quality: Ambient Laboratory Illumination

Photoperiod: 16 hours light, 8 hours dark

Test Chamber Size: 250 mL

Test Solution Volume: Minimum 200 mL

Age of Test Organisms: 4 days

Number of Mysids Per Test Chamber: 10

Number of Replicate Test Chambers Per Treatment: 4

Total Number of Mysids Per Test Concentration: 40

Feeding Regime: Light feeding using concentrated *Artemia* nauplii while holding prior to initiating the test.

Aeration: Aerated at <100 bubbles/minute

Dilution Water: Chelsea River

Alternate Control Water: NEB Artificial Salt Water (salinity 25 \pm 1 ppt)

Effluent Concentrations: 0%, 6.25%, 12.5%, 25%, 50% and 100% effluent

Test Duration: 48 hours

Effect measured: Mortality – no movement of body appendages on gentle prodding.

Test Acceptability: \geq 90% survival of test organisms in control solution Yes X No _

Sampling Requirements: Samples first used within 36 hours of collection Yes X No _

Sample Volume Required: Minimum 2 liters

Test Organism Source: New England Bioassay

Test Acceptability Criteria: Mean Alternate Water Control Survival = $\frac{100\%}{\text{Mean Dilution Water Control Survival} = 100\%}$

Test Results:

Limits

Results

48-hour LC50

N/A

>100%

Upper Value

 $\pm\infty$

Lower Value

100

Data Analysis Method Used

Graphical

A-NOEC

100%

Reference Toxicant Data:

Date:

11/1/16

Toxicant:

Sodium Dodecyl Sulfate

Dilution Water:

NEB Artificial Salt Water

Toxicant Source:

New England Bioassay

Organism Source:

New England Bioassay

48-hour LC50:

19.6 mg/L

In Acceptable Range:

Yes X No

Dechlorination Procedures: Chlorine is measured using 4500 CL-G DPD Colorimetric Method.

X Dechlorination was not required.

Sample was dechlorinated by adding sodium thiosulfate to the sample prior to test initiation. Since dechlorination of the effluent was necessary, a thiosulfate control of diluent water spiked with sodium thiosulfate was also included in the test series. Chlorine was _____ mg/L in a dechlorinated sample.

X Chlorine measurement was elevated in the effluent due to interference. Chlorine was <0.05 mg/ L when measured by amperometric titration.

Total Residual Chlorine was re-measured following aeration, and was found to be _____ mg/L.

Additional Notes or Other Conditions Affecting the Test:

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

MENIDIA BERYLLINA AQUATIC TOXICITY TEST REPORT

Test Reference Manual: EPA 821-R-02-012, "Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater Organisms and Marine Organisms", Fifth Edition

Test Method: *Menidia beryllina* Acute Toxicity Test – Method 2006.0

Test Type: Acute Static Non-Renewal Saltwater Test

Salinity: 25 ppt \pm 2 ppt by adding dry ocean salts (Instant Ocean)

Temperature : 25 \pm 1°C

Light Quality: Ambient Laboratory Illumination

Photoperiod: 16 hours light, 8 hours dark

Test Chamber Size: 250 mL

Test Solution Volume: Minimum 200 mL/replicate

Age of Test Organisms: 11 days old (24 hour age range)

Number of Fish Per Test Chamber: 10

Number of Replicate Test Chambers Per Treatment: 4

Total Number of Organisms Per Test Concentration: 40

Feeding Regime: Light feeding using concentrated *Artemia* nauplii while holding prior to initiating the test.

Aeration: Aerated at <100 bubbles/minute

Dilution Water: Chelsea River

Alternate Control Water: NEB Artificial Salt Water (salinity 25 \pm 1 ppt)

Effluent Concentrations: 0%, 6.25%, 12.5%, 25%, 50% and 100% effluent

Test Duration: 48 hours

Effect measured: Mortality – no movement on gentle prodding.

Test Acceptability: \geq 90% survival of test organisms in control solution Yes X No

Sampling Requirements: Samples first used within 36 hours of collection Yes X No

Sample Volume Required: Minimum 2 liters

Test Organism Source: Aquatic Biosystems

Test Acceptability Criteria: Mean Alternate Water Control Survival = 90%
Mean Dilution Water Control Survival = 95%

Test Results:

Limits

Results

48-hour LC50

N/A

>100%

Upper Value

 $\pm \infty$

Lower Value

100%

Data Analysis

Graph

A-NOEC

100%

Reference Toxicant Data:**Date:**

12/1/16

Toxicant:

Sodium Dodecyl Sulfate

Dilution Water:

NEB Artificial Salt Water

Toxicant Source:

New England Bioassay

Organism Source:

Aquatic Biosystems

48-hour LC50:

8.55 mg/L

In Acceptable Range:

Yes	X	No
-----	---	----

Dechlorination Procedures: Chlorine is measured using 4500 CL-G DPD Colorimetric Method.

X Dechlorination was not required.

Sample was dechlorinated by adding sodium thiosulfate to the sample prior to test initiation. Since dechlorination of the effluent was necessary, a thiosulfate control of diluent water spiked with sodium thiosulfate was also included in the test series. Chlorine was _____ mg/L in a dechlorinated sample.

X Chlorine measurement was elevated in the effluent due to interference. Chlorine was <0.05 mg/L when measured by amperometric titration.

Total Residual Chlorine was re-measured following aeration, and was found to be _____ mg/L.

Additional Notes or Other Conditions Affecting the Test:

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

NEW ENGLAND BIOASSAY ACUTE TOXICITY DATA FORM

COVER SHEET FOR LC50 TESTS

CLIENT: Eurofins Spectrum Analytical
 ADDRESS: 11 Almgren Drive
Agawam, MA 01001
 SAMPLE TYPE: Gulf Oil Terminal Outfall 003
 DILUTION WATER: Chelsea River

M. bahia TEST ID # 16-1755a
M. beryllina TEST ID # 16-1755b
 COC # C36-3992/93
 PROJECT # 05.0045469.00

Sample Date(s): 12/5/16

Received On: 12/6/16

INVERTEBRATES

TEST SET UP (TECH INIT) CB
 TEST SPECIES *Mysidopsis bahia*
 NEB LOT# Mb16 (12-2)
 AGE 4 days
 TEST SOLUTION VOLUME (mls) 200
 NO. ORGANISMS PER TEST CHAMBER 10
 NO. ORGANISMS PER CONCENTRATION 40
 NO. ORGANISMS PER CONTROL 40

	DATE	TIME
TEST START:	12/6/16	1548
TEST END:	12/8/16	1554

VERTEBRATES

TEST SET UP (TECH INIT) PD
 TEST SPECIES *Menidia beryllina*
 NEB LOT# Ss16AB (12-6)
 AGE 11 days
 TEST SOLUTION VOLUME (mls) 700
 NO. ORGANISMS PER TEST CHAMBER 10
 NO. ORGANISMS PER CONCENTRATION 40
 NO. ORGANISMS PER CONTROL 40

	DATE	TIME
TEST START:	12/6/16	1600
TEST END:	12/8/16	1543

LABORATORY CONTROL WATER:

ARTIFICIAL SW:	NEB BATCH#	Salinity (ppt)	Alkalinity (mg/L CaCO ₃)
	CRI036-035	25	125

RESULTS OF *Mysidopsis bahia* LC50 TEST

METHOD	LC50 (%)	95% Confidence Limits
BINOMIAL/GRAPHICAL	>100%	100%±∞
PROBIT		
SPEARMAN KARBUR		
NOAEL	100%	

RESULTS OF *Menidia beryllina* LC50 TEST

METHOD	LC50 (%)	95% Confidence Limits
BINOMIAL/GRAPHICAL	>100%	100%±∞
PROBIT		
SPEARMAN KARBUR		
NOAEL	100%	

NOEC: NO OBSERVABLE EFFECT CONCENTRATION

Comments:

242g IO added to 10L effluent to bring salinity up to 25ppt.

460g of IO added to 20L River to bring salinity up to 25ppt.

REVIEWD BY:



DATE:

12/29/16

**NEW ENGLAND BIOASSAY
Toxicity Test Data Sheet**

NEB Test #: 16-1755a

Project #: 05.0045469.00

Facility Name: Gulf Oil Terminal

Date Sampled: 12/5/16

Date Received: 12/6/16

Sample ID: Outfall 003

Test Organism: Mysidopsis bahia

Organism Age: 4 days

Test Duration: 48 (hours)

Beginning Date: 12/6/16 Time: 1548

Dilution Water Source: Chelsea River

Salinity: 24 ppt

Effluent Conc. %	Number of Surviving Organisms			Dissolved Oxygen (mg/L)			Temperature (°C)			pH (su)			Salinity (ppt)		
	CB	ER	ER	KO	ER	CB	KO	ER	CB	KO	ER	CB	KO	ER	CB
Initials	0	24	48	0	24	48	0	24	48	0	24	48	0	24	48
Control A	10	10	10	7.3	5.7	5.8	24.5	24.7	24.9	8.1	7.8	7.8	25	25	26
Control B	10	10	10		5.3	4.4		25.1	25.4		7.8	7.7		25	25
Control C	10	10	10		5.1	4.2		25.3	25.8		7.8	7.7		25	25
Control D	10	10	10		5.1	4.3		25.4	25.8		7.8	7.7		25	25
Diluent A	10	10	10	7.5	5.4	4.8	24.9	25.1	25.5	7.9	7.8	7.8	24	24	25
Diluent B	10	10	10		5.1	4.1		25.4	25.8		7.8	7.7		24	24
Diluent C	10	10	10		4.8	3.8		25.5	26.0		7.7	7.7		24	24
Diluent D	10	10	10		5.2	3.9		25.3	25.8		7.8	7.8		24	25
6.25 A	10	10	10	7.7	5.4	4.7	24.9	25.3	25.6	7.9	7.8	7.8	24	24	25
6.25 B	10	10	10		5.4	4.3		25.4	25.8		7.8	7.8		24	24
6.25 C	10	10	10		4.8	4.2		25.4	25.9		7.8	7.7		24	24
6.25 D	10	10	10		4.9	4.0		25.4	25.9		7.8	7.8		24	25
12.5 A	10	10	10	7.7	5.5	4.9	24.8	25.0	25.3	7.9	7.9	7.8	25	25	25
12.5 B	10	10	10		8.4	4.7		25.4	25.6		7.8	7.7		24	25
12.5 C	10	10	10		5.3	4.0		25.3	25.8		7.8	7.8		24	25
12.5 D	10	10	10		5.2	4.1		25.3	25.8		7.8	7.8		24	25
25 A	10	10	10	7.7	6.0	4.8	25.1	24.9	25.3	7.9	7.9	7.8	25	25	26
25 B	10	10	10		5.5	4.2		25.2	25.7		7.8	7.8		24	25
25 C	10	10	10		5.2	3.7		25.3	25.9		7.8	7.7		24	25
25 D	10	10	10		5.2	4.7		25.1	25.5		7.8	7.8		25	25

LC50	Confidence Interval	A-NOEC	Computational Method
>100%	100%±∞	100%	Graphical

NEB Test #:	16-1755a
Project #:	05.0045469.00
Facility Name:	Gulf Oil Terminal
Date Sampled:	12/5/16
Date Received:	12/6/16
Sample ID:	Outfall 003

Test Organism: Mysidopsis bahia

Organism Age: 4 days

Test Duration: 48 (hours)

Beginning Date: 12/6/16 Time: 1548

Dilution Water Source: Chelsea River

Salinity: 24 ppt

[illegible]

LC50	Confidence Interval	A-NOEC	Computational Method
>100%	100%±∞	100%	Graphical

CT-TOX: BINOMIAL, MOVING AVERAGE, PROBIT, AND SPEARMAN METHODS

MINIMUM REQUIRED TRIM IS TOO LARGE: 100.0, SO SK IS NOT CALCULABLE.
SPEARMAN-KARBER

TRIM: .00%
LC50: .000
95% CONFIDENCE LIMITS
ARE UNRELIABLE.

CONC. %	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (%)
6.25	40.	0.	.00	.9095D-10
12.50	40.	0.	.00	.9095D-10
25.00	40.	0.	.00	.9095D-10
50.00	40.	0.	.00	.9095D-10
100.00	40.	0.	.00	.9095D-10

THE BINOMIAL TEST SHOWS THAT 100.00 AND +INFINITY CAN BE USED AS
STATISTICALLY SOUND CONSERVATIVE 95 PERCENT CONFIDENCE LIMITS SINCE THE
ACTUAL CONFIDENCE LEVEL ASSOCIATED WITH THESE LIMITS IS 100.0000 PERCENT.
THE LC50 FOR THIS DATA SET IS GREATER THAN 100.00

WHEN THERE ARE LESS THAN TWO CONCENTRATIONS AT
WHICH THE PERCENT DEAD IS BETWEEN 0 AND 100, NEITHER
THE MOVING AVERAGE NOR THE PROBIT METHOD CAN GIVE
ANY STATISTICALLY SOUND RESULTS.

DATE: 12/6/16	TEST NUMBER: 16-1755a	DURATION: 48 h
SAMPLE: Gulf Oil	SPECIES: Mysidopsis bahia	

METHOD	LC50	CONFIDENCE LIMITS		
		LOWER	UPPER	SPAN
BINOMIAL	*****	100.000	*****	*****
MAA	*****	*****	*****	*****
PROBIT	*****	*****	*****	*****
SPEARMAN	.000	*****	*****	*****

**** = LIMIT DOES NOT EXIST

**NEW ENGLAND BIOASSAY
Toxicity Test Data Sheet**

NEB Test #: 16-1755b

Project #: 05.0045469.00

Facility Name: Gulf Oil Terminal

Date Sampled: 12/5/16

Date Received: 12/6/16

Sample ID: Outfall 003

Test Organism: Menidia beryllina

Organism Age: 11 days

Test Duration: 48 (hours)

Beginning Date: 12/6/16 Time: 1600

Dilution Water Source: Chelsea River

Salinity: 24 ppt

Effluent Conc. %	Number of Surviving Organisms			Dissolved Oxygen (mg/L)			Temperature (°C)			pH (su)			Salinity (ppt)		
	PD	ER	ER	KO	ER	CB	KO	ER	CB	KO	ER	CB	KO	ER	CB
Initials	0	24	48	0	24	48	0	24	48	0	24	48	0	24	48
Control A	10	10	10	7.3	6.3	6.7	24.5	25.1	24.6	8.1	7.9	8.0	25	24	25
Control B	10	9	9		6.3	6.5		25.2	25.0		7.9	8.0		24	25
Control C	10	10	9		6.3	6.5		25.1	25.0		8.0	8.0		24	25
Control D	10	8	8		6.4	6.6		25.0	24.5		8.0	8.0		24	25
Diluent A	10	10	10	7.5	6.8	6.6	24.9	25.1	24.8	7.9	7.9	8.0	24	24	25
Diluent B	10	10	10		6.6	6.6		24.9	24.7		7.9	8.0		24	25
Diluent C	10	8	8		6.7	6.6		24.7	24.5		7.9	8.0		24	25
Diluent D	10	10	10		6.7	6.7		24.6	24.4		7.9	8.0		24	25
6.25 A	10	10	10	7.7	6.4	6.4	24.9	25.4	25.2	7.9	7.9	8.0	24	24	24
6.25 B	10	10	10		6.5	6.4		25.2	25.2		7.9	8.0		24	24
6.25 C	10	10	10		6.5	6.5		25.0	25.1		7.9	8.0		24	25
6.25 D	10	10	10		6.5	6.5		24.8	24.7		7.9	8.0		24	25
12.5 A	10	10	10	7.7	6.5	6.5	24.8	25.2	25.2	7.9	7.9	8.0	25	24	25
12.5 B	10	10	10		6.4	6.2		25.2	25.4		7.9	8.0		24	24
12.5 C	10	10	10		6.3	6.2		25.2	25.4		7.9	8.0		24	24
12.5 D	10	10	10		6.3	6.3		25.1	25.1		7.9	8.0		24	24
25 A	10	9	9	7.7	6.5	6.4	25.1	25.0	25.2	7.9	7.9	8.0	25	24	25
25 B	10	9	9		6.4	6.4		25.1	25.3		7.9	8.0		24	25
25 C	10	10	10		6.5	6.4		24.8	24.8		8.0	8.1		24	25
25 D	10	5	5		6.5	6.5		24.7	24.7		8.0	8.1		24	25

LC50	Confidence Interval	A-NOEC	Computational Method
>100%	100%±∞	100%	Graphical

**NEW ENGLAND BIOASSAY
Toxicity Test Data Sheet**

NEB Test #: 16-1755b

Project #: 05.0045469.00

Facility Name: Gulf Oil Terminal

Date Sampled: 12/5/16

Date Received: 12/6/16

Sample ID: Outfall 003

Test Organism: Menidia beryllina

Organism Age: 11 days

Test Duration: 48 (hours)

Beginning Date: 12/6/16 Time: 1600

Dilution Water Source: Chelsea River

Salinity: 24 ppt

Effluent Conc. %	Number of Surviving Organisms			Dissolved Oxygen (mg/L)			Temperature (°C)			pH (su)			Salinity (ppt)		
	PD	ER	ER	KO	ER	CB	KO	ER	CB	KO	ER	CB	KO	ER	CB
Initials	0	24	48	0	24	48	0	24	48	0	24	48	0	24	48
50 A	10	10	10	7.6	6.6	6.6	25.4	24.9	24.9	7.9	8.0	8.1	25	25	25
50 B	10	10	10		6.5	6.5		24.9	25.1		8.0	8.1		24	25
50 C	10	10	10		6.6	6.4		24.7	24.9		8.0	8.1		25	25
50 D	10	9	9		6.7	6.6		24.5	24.5		8.0	8.1		25	25
100 A	10	9	9	7.6	6.7	6.7	25.9	24.7	24.9	8.0	8.0	8.1	25	25	25
100 B	10	10	10		6.6	6.5		24.9	25.2		8.0	8.1		25	25
100 C	10	9	9		6.5	6.5		25.0	25.3		8.0	8.1		25	25
100 D	10	10	10		6.5	6.5		24.7	24.8		8.0	8.1		25	25

LC50	Confidence Interval	A-NOEC	Computational Method
>100%	100%±∞	100%	Graphical

CT-TOX: BINOMIAL, MOVING AVERAGE, PROBIT, AND SPEARMAN METHODS

MINIMUM REQUIRED TRIM IS TOO LARGE: 91.7, SO SK IS NOT CALCULABLE.
SPEARMAN-KARBER

TRIM: .00%
LC50: .000
95% CONFIDENCE LIMITS
ARE UNRELIABLE.

CONC. %	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (%)
6.25	40.	0.	.00	.9095D-10
12.50	40.	0.	.00	.9095D-10
25.00	40.	7.	17.50	.2114D-02
50.00	40.	1.	2.50	.3729D-08
100.00	40.	2.	5.00	.7467D-07

THE BINOMIAL TEST SHOWS THAT 100.00 AND +INFINITY CAN BE USED AS
STATISTICALLY SOUND CONSERVATIVE 95 PERCENT CONFIDENCE LIMITS SINCE THE
ACTUAL CONFIDENCE LEVEL ASSOCIATED WITH THESE LIMITS IS 100.0000 PERCENT.
THE LC50 FOR THIS DATA SET IS GREATER THAN 100.00

THE MOVING AVERAGE METHOD CANNOT BE USED WITH
THIS DATA SET BECAUSE NO SPAN WHICH PRODUCES
AVERAGE ANGLES BRACKETING 45 DEGREES ALSO USES
TWO PERCENT DEAD BETWEEN 0 AND 100 PERCENT.

NO CONVERGENCE IN 25 ITERATIONS. PROBIT METHOD
PROBABLY CAN NOT BE USE WITH THIS SET OF DATA.

DATE: 12/6/16 TEST NUMBER: 16-1755b DURATION: 48 h
SAMPLE: Gulf Oil SPECIES: Menidia beryllina

METHOD	LC50	CONFIDENCE LIMITS		
		LOWER	UPPER	SPAN
BINOMIAL	*****	100.000	*****	*****
MAA	*****	*****	*****	*****
PROBIT	*****	*****	*****	*****
SPEARMAN	.000	*****	*****	*****

NOTE: MORTALITY PROPORTIONS WERE NOT MONOTONICALLY INCREASING.
ADJUSTMENTS WERE MADE PRIOR TO SPEARMAN-KARBER ESTIMATION.

**** = LIMIT DOES NOT EXIST

CETIS Analytical Report

Report Date: 28 Dec-16 16:35 (p 1 of 2)
Test Code: 16-1755b | 01-4311-3758

Inland Silverside 96-h Acute Survival Test

New England Bioassay

Analysis ID: 08-8923-9220	Endpoint: 48h Survival Rate	CETIS Version: CETISv1.9.2
Analyzed: 28 Dec-16 16:34	Analysis: Nonparametric-Control vs Treatments	Official Results: Yes
Batch ID: 00-5054-5699	Test Type: Survival (96h)	Analyst:
Start Date: 06 Dec-16 16:00	Protocol: EPA/821/R-02-012 (2002)	Diluent: Receiving Water
Ending Date: 08 Dec-16 15:43	Species: Menidia beryllina	Brine: Instant Ocean
Duration: 48h	Source: Aquatic Biosystems, CO	Age: 11d
Sample ID: 01-5826-5638	Code: 96EF126	Client: Spectrum Analytical
Sample Date: 05 Dec-16	Material: Industrial Effluent	Project:
Receipt Date: 06 Dec-16	Source: Gulf Oil Terminal (MA0001091)	
Sample Age: 40h	Station:	

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	C > T	100	> 100	n/a		16.09%

Steel Many-One Rank Sum Test

Control	vs	Conc-mg/L	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Dilution Water		6.25	20	10	1	6	Asymp	0.9516	Non-Significant Effect
		12.5	20	10	1	6	Asymp	0.9516	Non-Significant Effect
		25	14.5	10	1	6	Asymp	0.4092	Non-Significant Effect
		50	18.5	10	1	6	Asymp	0.8729	Non-Significant Effect
		100	17	10	1	6	Asymp	0.7334	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.156207	0.0312413	5	1.678	0.1909	Non-Significant Effect
Error	0.335114	0.0186174	18			
Total	0.49132		23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	4.34	4.248	0.0091	Unequal Variances
Variances	Mod Levene Equality of Variance Test	1.09	4.248	0.3995	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.8279	0.884	8.7E-04	Non-Normal Distribution

48h Survival Rate Summary

Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	D	4	0.9500	0.7909	1.0000	1.0000	0.8000	1.0000	0.0500	10.53%	0.00%
6.25		4	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	-5.26%
12.5		4	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	-5.26%
25		4	0.8250	0.4722	1.0000	0.9000	0.5000	1.0000	0.1109	26.88%	13.16%
50		4	0.9750	0.8954	1.0000	1.0000	0.9000	1.0000	0.0250	5.13%	-2.63%
100		4	0.9500	0.8581	1.0000	0.9500	0.9000	1.0000	0.0289	6.08%	0.00%

Angular (Corrected) Transformed Summary

Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	D	4	1.336	1.093	1.578	1.412	1.107	1.412	0.07622	11.41%	0.00%
6.25		4	1.412	1.412	1.412	1.412	1.412	1.412	0	0.00%	-5.71%
12.5		4	1.412	1.412	1.412	1.412	1.412	1.412	0	0.00%	-5.71%
25		4	1.174	0.744	1.604	1.249	0.7854	1.412	0.1351	23.01%	12.12%
50		4	1.371	1.242	1.501	1.412	1.249	1.412	0.04074	5.94%	-2.66%
100		4	1.331	1.181	1.48	1.331	1.249	1.412	0.04705	7.07%	0.39%

Inland Silverside 96-h Acute Survival Test

New England Bioassay

Analysis ID: 08-8923-9220 Endpoint: 48h Survival Rate CETIS Version: CETISv1.9.2
 Analyzed: 28 Dec-16 16:34 Analysis: Nonparametric-Control vs Treatments Official Results: Yes

48h Survival Rate Detail

Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	D	1.0000	1.0000	0.8000	1.0000
6.25		1.0000	1.0000	1.0000	1.0000
12.5		1.0000	1.0000	1.0000	1.0000
25		0.9000	0.9000	1.0000	0.5000
50		1.0000	1.0000	1.0000	0.9000
100		0.9000	1.0000	0.9000	1.0000

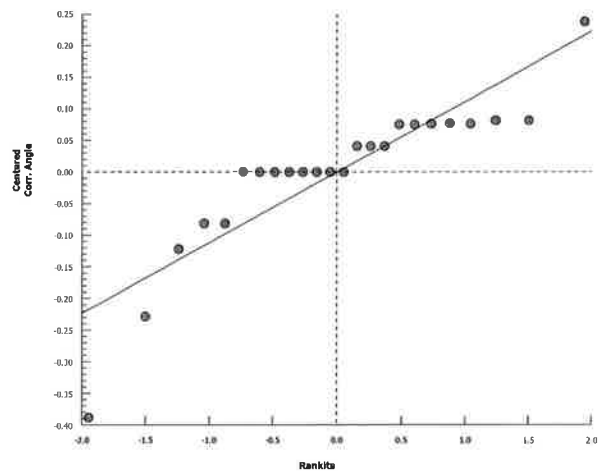
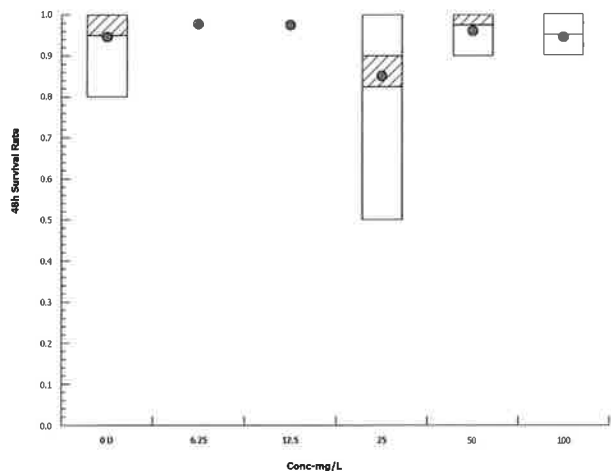
Angular (Corrected) Transformed Detail

Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	D	1.412	1.412	1.107	1.412
6.25		1.412	1.412	1.412	1.412
12.5		1.412	1.412	1.412	1.412
25		1.249	1.249	1.412	0.7854
50		1.412	1.412	1.412	1.249
100		1.249	1.412	1.249	1.412

48h Survival Rate Binomials

Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	D	10/10	10/10	8/10	10/10
6.25		10/10	10/10	10/10	10/10
12.5		10/10	10/10	10/10	10/10
25		9/10	9/10	10/10	5/10
50		10/10	10/10	10/10	9/10
100		9/10	10/10	9/10	10/10

Graphics



INITIAL CHEMISTRY INFORMATION

CLIENT:

Gulf Oil Terminal - 003

PROJECT #

05.0045469.00

RECIEPT DATE		
SAMPLE	Effluent	Receiving Water
COC #	C36-3992	C36-3993
Temperature (°C)	1.9	2.6
Dissolved Oxygen (mg/L)	12.1	11.4
pH (standard units)	7.5	7.6
Conductivity (µmhos/cm)	6,758	9,686
Salinity (ppt)	4	5
Hardness (as mg/L CaCO ₃)	618	1000
Alkalinity (as mg/L CaCO ₃)	40	40
TRC - DPD (mg/L)	0.086*	0.034
INITIALS	KO	KO

Additional notes:

*TRC was <0.05 mg/L when measured by amperometric titration.



Spectrum Analytical

SUBCONTRACT ORDER

SC29107

SENDING LABORATORY:

Eurofins Spectrum Analytical, Inc.
11 Almgren Drive
Agawam, MA 01001
Phone: (413) 789-9018
Fax: (413) 789-4076
Project Manager: Dulce Litchfield

Project: Gulf Terminal - Chelsea, MA

RECEIVING LABORATORY:

GZA Geoenvironmental, Inc. - Manchester, CT*
77 Batson Drive
Manchester, CT 06042
Phone: (860) 286-8900
Fax: (860) 242-8389

Project #: Gulf Chelsea

PO Number: SC29107

BILL TO:

Eurofins Spectrum Analytical, Inc.
2425 New Holland Pike
Lancaster, PA 17601
Attention: Accounts Payable
accounts payable@eurofinsus.com
PO Number: SC29107

Laboratory ID	Sample ID	Sampled	Matrix	Analysis	Due	Comments
036-3992	SC29107-01	05-Dec-16 11:00	Surface Water	Aquatic Tox	20-Dec-16 16:00	Client ID is Outfall 003/LC50

Containers Supplied:

Other (L)

Please send notice within 24 hours of obtaining valid data, of the results of all drinking water samples that exceed any EPA or Department-established maximum contaminant level, maximum residual disinfectant level or reportable concentration. Notice should be emailed to SpectrumLabResults@EurofinsUS.com.

Please notify SpectrumLabResults@EurofinsUS.com immediately and prior to conducting analysis if certification is not held for the analyses requested.

Please e-mail results in electronic format to SpectrumLabResults@EurofinsUS.com.

Released By
Dulce Litchfield

12/16/16 7:46
Date

Received By
J. S. Litchfield

12/16/16 10:55
Date

Temp °C

Released By

Date

Received By

Date



Spectrum Analytical

SUBCONTRACT ORDER

SC29104

SENDING LABORATORY:

Eurofins Spectrum Analytical, Inc.
11 Almgren Drive
Agawam, MA 01001
Phone: (413) 789-9018
Fax: (413) 789-4076
Project Manager: Dulce Litchfield

Project: Gulf Terminal - Chelsea, MA

RECEIVING LABORATORY:

GZA Geoenvironmental, Inc. - Manchester, CT*
77 Batson Drive
Manchester, CT 06042
Phone: (860) 286-8900
Fax: (860) 242-8389

Project #: Gulf Chelsea

PO Number: SC29104

BILL TO:

Eurofins Spectrum Analytical, Inc.
2425 New Holland Pike
Lancaster, PA 17601
Attention: Accounts Payable
accounts payable@eurofinsus.com
PO Number: SC29104

Laboratory ID	Sample ID	Sampled	Matrix	Analysis	Due	Comments
036-3993	SC29104-01	05-Dec-16 11:00	Surface Water	Aquatic Tox	20-Dec-16 16:00	Client ID is Chelsea Creek/LC50
Containers Supplied:						
Other (J)						

Please send notice within 24 hours of obtaining valid data, of the results of all drinking water samples that exceed any EPA or Department-established maximum contaminant level, maximum residual disinfectant level or reportable concentration. Notice should be emailed to SpectrumLabResults@EurofinsUS.com.

Please notify SpectrumLabResults@EurofinsUS.com immediately and prior to conducting analysis if certification is not held for the analyses requested.

Please e-mail results in electronic format to SpectrumLabResults@EurofinsUS.com.

Released By DAVID Date 12/16/16 7:46 Received By [Signature] Date 12/16/16 0855 Temp °C

Released By _____ Date _____ Received By _____ Date _____

NEB SALTWATER SPECIES ACCLIMATION RECORD

Species: <u>Menidia beryllina</u>	Client: <u>Gulf Out Chelsea</u>	Quantity: <u>305</u>	*Mortality upon arrival 6
Source: <u>Aquatic Biosystems</u>	Test ID:	Age: <u>11 days on 12-6-16</u>	
Lot #: <u>SS(6 AB(12-16))</u>		* Mortality > 10% - Notify management	

Allowable Mortality: > 5% mortality = Notify management.

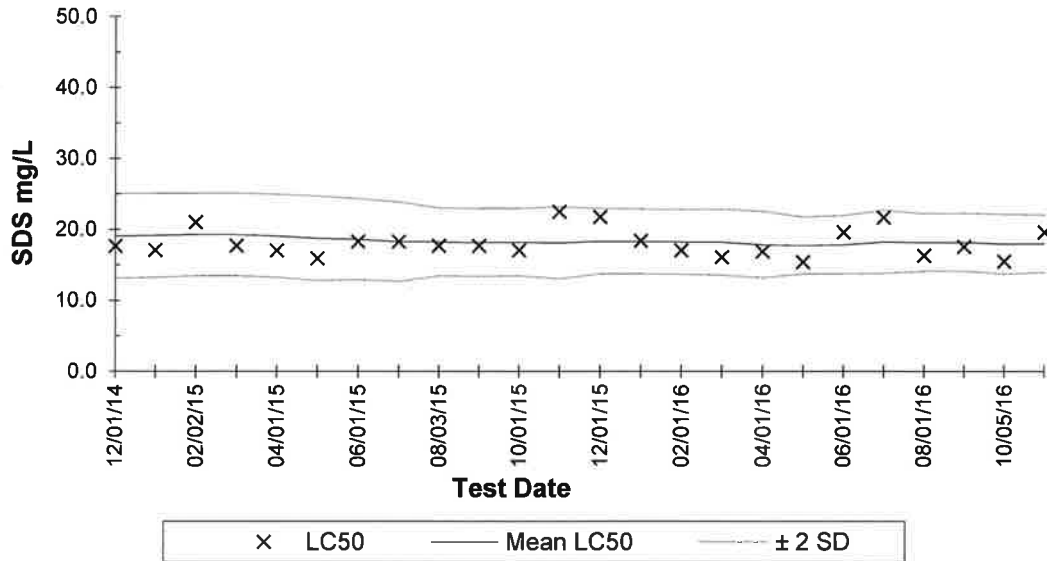
Allowable Acclimation: Fish = No more than 50% tank volume water change over a 12 (twelve) hour period.

Mysids = Need to be +/- 2 ppt of test dilution water.

Water Chemistry						Observations						
Date	D.O. (mg/L)	p.H. (SU)	Temp. (C) *	Alkal. (mg/L) ml titrant	Sal. (ppt) **	Feedings			Behavioral observations	Do organisms look stressed?	Mortalities	Comments / Treatment type
						AM	NOON	PM	A = Normal, B = Erratic mov. C = Dead	Yes / No	# of dead organisms removed from tank	
12-6-16	9.0	7.7	21.3	179 3.4ml	25	A+			A	No		Acclimated to ASW.

New England Bioassay
Reference Toxicant Data: *Mysidopsis bahia* 48-hour LC50

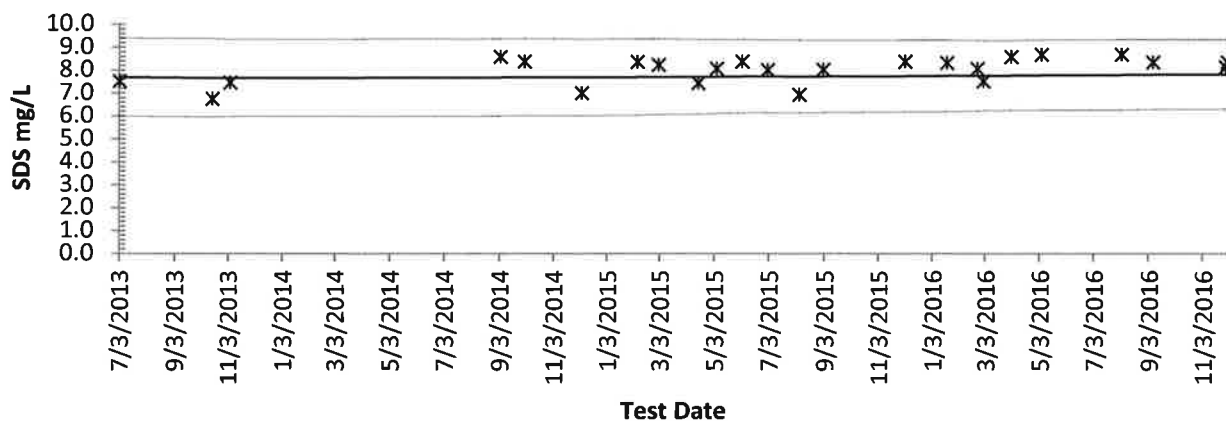
Reference Toxicant: Sodium Dodecyl Sulfate
Test Dates: Dec 2014 - Nov 2016



Test ID	Date	LC ₅₀	Mean LC ₅₀	STD	-2STD	+2STD	CV	CV National 75th & 90th%
14-1962	12/1/2014	17.7	19.1	3.0	13.1	25.0	0.16	0.26
15-109	1/20/2015	17.1	19.1	3.0	13.2	25.1	0.15	0.26
15-140	2/2/2015	21.0	19.3	2.9	13.5	25.1	0.15	0.26
15-258	3/2/2015	17.7	19.3	2.9	13.5	25.1	0.15	0.26
15-414	4/1/2015	17.1	19.1	2.9	13.2	24.9	0.15	0.26
15-549	5/1/2015	15.9	18.7	3.0	12.8	24.7	0.16	0.26
15-704	6/1/2015	18.3	18.6	2.9	12.9	24.3	0.15	0.26
15-900	7/2/2015	18.3	18.3	2.8	12.7	23.9	0.15	0.26
15-1082	8/3/2015	17.7	18.3	2.4	13.5	23.1	0.13	0.26
15-1296	9/1/2015	17.7	18.2	2.4	13.4	23.0	0.13	0.26
15-1458	10/1/2015	17.1	18.2	2.4	13.5	23.0	0.13	0.26
15-1687	11/2/2015	22.5	18.1	2.5	13.1	23.2	0.14	0.26
15-1776	12/1/2015	21.8	18.4	2.3	13.8	23.0	0.13	0.26
16-34	1/4/2016	18.4	18.3	2.3	13.7	22.9	0.12	0.26
16-142	2/1/2016	17.1	18.3	2.3	13.7	22.8	0.12	0.26
16-338	3/8/2016	16.1	18.2	2.3	13.6	22.9	0.13	0.26
16-460	4/1/2016	16.9	17.9	2.3	13.2	22.5	0.13	0.26
16-600	5/2/2016	15.4	17.8	2.0	13.7	21.8	0.11	0.26
16-709	6/1/2016	19.6	17.9	2.0	13.8	22.0	0.11	0.26
16-849	7/1/2016	21.7	18.3	2.2	13.8	22.7	0.12	0.26
16-1058	8/1/2016	16.3	18.2	2.0	14.1	22.2	0.11	0.26
16-1256	9/7/2016	17.6	18.2	2.0	14.1	22.3	0.11	0.26
16-1471	10/5/2016	15.5	17.9	2.1	13.7	22.1	0.12	0.26
16-1590	11/1/2016	19.6	18.0	2.0	14.0	22.1	0.11	0.26

New England Bioassay
Reference Toxicant Data: *Menidia beryllina* 96-hour LC50

Reference Toxicant: Sodium Dodecyl Sulfate
Test Dates: July 2013 - Dec 2016



* LC50 — Mean LC50 - - - +/- 2 STD

Test ID	Date	LC50	Mean LC50	STD	-2STD	+2STD	CV	CV National	CV National
								75th%	90th%
13-1369	7/3/2013	7.5	7.7	0.9	6.0	9.4	0.11	0.21	0.44
13-2147	10/16/2013	6.7	7.7	0.9	6.0	9.4	0.11	0.21	0.44
13-2340	11/5/2013	7.5	7.7	0.8	6.0	9.3	0.11	0.21	0.44
14-1395	9/4/2014	8.6	7.7	0.8	6.0	9.4	0.11	0.21	0.44
14-1574	10/1/2014	8.4	7.7	0.8	6.0	9.4	0.11	0.21	0.44
14-1983	12/5/2014	7.0	7.7	0.8	6.0	9.4	0.11	0.21	0.44
14-142	2/6/2015	8.3	7.7	0.8	6.0	9.4	0.11	0.21	0.44
15-259	3/2/2015	8.2	7.7	0.8	6.1	9.4	0.11	0.21	0.44
15-585	4/15/2015	7.4	7.7	0.8	6.1	9.3	0.11	0.21	0.44
15-623	5/6/2015	8.1	7.7	0.8	6.1	9.3	0.10	0.21	0.44
15-705	6/3/2015	8.4	7.7	0.8	6.1	9.3	0.10	0.21	0.44
15-901	7/2/2015	8.0	7.7	0.8	6.2	9.3	0.10	0.21	0.44
15-1083	8/6/2015	6.9	7.7	0.8	6.1	9.3	0.10	0.21	0.44
15-1297	9/2/2015	8.0	7.7	0.8	6.2	9.3	0.10	0.21	0.44
15-1825	12/3/2015	8.4	7.7	0.8	6.2	9.3	0.10	0.21	0.44
16-108	1/20/2016	8.3	7.8	0.8	6.2	9.3	0.10	0.21	0.44
16-260	2/23/2016	8.1	7.8	0.8	6.2	9.3	0.10	0.21	0.44
16-303	3/1/2016	7.5	7.8	0.8	6.2	9.3	0.10	0.21	0.44
16-461	4/1/2016	8.6	7.8	0.8	6.2	9.3	0.10	0.21	0.44
16-602	5/5/2016	8.7	7.8	0.8	6.3	9.3	0.10	0.21	0.44
16-1060	8/3/2016	8.7	7.8	0.8	6.3	9.3	0.10	0.21	0.44
16-1282	9/8/2016	8.3	7.8	0.8	6.3	9.3	0.10	0.21	0.44
16-1705	11/29/2016	8.1	7.8	0.8	6.3	9.3	0.10	0.21	0.44
16-1739	12/1/2016	8.3	7.8	0.8	6.3	9.3	0.10	0.21	0.44

CHAIN OF CUSTODY RECORD

Page 1 of 1

Special Handling:

- ☒ Standard TAT - 7 to 10 business days
☐ Rush TAT - Date Needed: _____
 All TATs subject to laboratory approval
 Min. 24-hr notification needed for rushes
 Samples disposed after 60 days unless otherwise instructed

Report To: Andrew Adams

Gulf Oil LP

281 Eastern Ave

Chelsea, MA 02150

Telephone #:

617.884.5980

Project Mgr:

Andrew Adams

Invoice To: Christopher Gill

Gulf Oil LP

80 William St, Suite 400

Wellesley, MA 02481-3705

P.O. No.:

Quote/RQN:

Project No.:

Site Name:

Location:

Sampler(s):

Gulf Chelsea

Gulf Chelsea Terminal

281 Eastern Ave, Chelsea

Andrew Adams

State: MA

F=Field Filtered 1=Na₂SO₃ 2=HCl 3=H₂SO₄ 4=HNO₃ 5=NaOH 6=Ascorbic Acid
 7=CH₃OH 8=NaHSO₄ 9=Deionized Water 10=H₃PO₄ 11= none 12=

DW=Drinking Water GW=Groundwater SW=Surface Water WW=Waste Water
 O=Oil SO=Soil SL=Sludge A=Indoor/Ambient Air SG=Soil Gas

X1= X2= X3=

G=Grab

C=Composite

Type Matrix

of VOA Vials
 # of Amber Glass
 # of Clear Glass
 # of Plastic

Ammonia
 TRC, salinity, pH, TS, TSS
 BTEX & naphthalene
 PAHs
 TOC
 Total Recov. (Cd, Cu, Pb, Ni, Zn)*
 LC50

Check if chlorinated

MA DEP MCP CAM Report? ☐ Yes ☐ No
 CT DPH RCP Report? ☐ Yes ☐ No
☒ Standard ☐ No QC
☐ ASP A* ☐ ASP B*
☐ NJ Reduced* ☐ NJ Full*
☐ Tier II* ☐ Tier IV*
☐ Other: _____
 State-specific reporting standards
 * Report metals down to the MDL

SC29104-21

12-5-16	1100	G	SW			1		X																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
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Received by:

Date:

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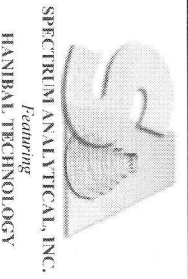
Condition upon receipt: Custody Seal: Present ☐ Intact ☐ Broken ☐

Condition upon receipt: Ambient ☐ Iced ☐ Refrigerated ☐ DI VOA Frozen ☐ Soil Jar Frozen ☐

Condition upon receipt: Ambient ☐ Iced ☐ Refrigerated ☐ DI VOA Frozen ☐ Soil Jar Frozen ☐

Condition upon receipt: Ambient ☐ Iced ☐ Refrigerated ☐ DI VOA Frozen ☐ Soil Jar Frozen ☐

Condition upon receipt: Ambient ☐ Iced ☐ Refrigerated ☐ DI VOA Frozen ☐ Soil Jar Frozen ☐



CHAIN OF CUSTODY RECORD

Page 2 of 2

Special Handling:

- ☒ Standard TAT - 7 to 10 business days
☐ Rush TAT - Date Needed: _____
All TATs subject to laboratory approval
Min. 24-hr notification needed for rushes
Samples disposed after 60 days unless otherwise instructed

Report To: Andrew Adams

Gulf Oil LP
281 Eastern Ave
Chelsea, MA 02150

Telephone #:

617 884.5980

Project Mgr:

Andrew Adams

Invoice To: Christopher Gill

Gulf Oil LP
80 William St, Suite 400
Wellesley, MA 02481-3705

P.O. No.:

Quote/RON:

Project No:

Site Name:

Location:

Sampler(s):

Gulf Chelsea

Gulf Chelsea Terminal

281 Eastern Ave, Chelsea

State: MA

F=Field Filtered I=Na₂S₂O₃ 2=HCl 3=H₂SO₄ 4=HNO₃ 5=NaOH 6=Ascorbic Acid
7=CH₃OH 8=NaHSO₄ 9=Deionized Water 10=H₂PO₄ 11= 12=

DW=Drinking Water

GW=Groundwater

SW=Surface Water

WW=Waste Water

O=Oil

SO=Soil

SL=Sludge

A=Indoor/Ambient Air

SG=Soil Gas

X1=

X2=

X3=

G=Grab

C=Compsite

Lab ID:

Sample ID:

Date:

Time:

Type Matrix

of VOA Vials
of Amber Glass
of Clear Glass
of Plastic

Total Recov. (Cd, Cr, Cu, Pb, Ni, Zn)*
LC50 **

Analysis

Check if chlorinated

QA/QC Reporting Notes:
* additional charges may apply
MA DEP MCP CAM Report? ☐ Yes ☐ No
CT DPH RCP Report? ☐ Yes ☐ No
☒ Standard ☐ No QC
☐ DQA* ☐ ASP A* ☐ ASP B*
☐ NJ Reduced* ☐ NJ Full*
☐ Tier II* ☐ Tier IV*
☐ Other: _____
State-specific reporting standards
* Report metals down to MDL
**LC50 sub to GZA
Required Minimum Levels:
Cd, Pb, Ni - 0.2 ug/L
Cu - 0.5 ug/L
Cr - 1 ug/L
Zn - 5 ug/L

Relinquished by:

Received by:

Date:

Time:

Temp °C

Condition upon receipt:

Custody Seals:

Present ☐ Intact ☐ Broken

Refrigerated ☐ Dry VOA Frozen ☐ Soil Jar Frozen ☐

Signature

Signature

12-5-16 1:10
12-5-16 1735

3.3
3.3

Condition upon receipt: Ambient ☒ Ice ☐ Refrigerated ☐ Dry VOA Frozen ☐ Soil Jar Frozen ☐

Custody Seals: Present ☐ Intact ☐ Broken

Refrigerated ☐ Dry VOA Frozen ☐ Soil Jar Frozen ☐

Present ☐ Intact ☐ Broken

Refrigerated ☐ Dry VOA Frozen ☐ Soil Jar Frozen ☐